# ALL THAT GLITTERS IS NOT GOLD: THE RE-USE OF SECURITIES COLLATERAL AS A SOURCE OF SYSTEMIC RISK


**DPhil Thesis**

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# ABSTRACT

Since the 1980s, regulators in the U.S. and the U.K. have protected the collateral taker's right to re-use securities collateral in securities financing and OTC derivatives markets on the understanding that it would promote liquidity and credit growth, and reduce systemic risk. However, this rationale was incomplete: it failed to acknowledge the full implications of collateral re-use for systemic risk. In this dissertation, I aim to complete that understanding by illustrating how the re-use of securities collateral in those markets can aggravate systemic risk. In particular, I describe two effects. First, re-using securities collateral multiplies the number of market participants that will be exposed to changes in the price of the collateral asset and can thus amplify the role of asset prices as channels of contagion. Second, by conferring a right to re-use, the collateral provider will effectively waive its proprietary interests in the collateral assets and retain a mere contractual claim against the collateral taker for the return of equivalent securities. This transformation will accentuate the incentive of the collateral provider to run from an over-collateralised collateral taker if the latter were to experience financial difficulty. Information asymmetries and a lack of coordination among collateral providers could push the collateral taker over the brink of insolvency. These risks pose an obvious question for regulators: what should we do about collateral re-use? At a time when international bodies are drawing their attention to this widespread market practice, the question is an invitation to a very timely reflection. The final chapter of the dissertation offers an answer to this question and assesses the potential efficacy of the most recent regulatory initiatives in relation to collateral re-use.

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## TABLE OF ABBREVIATIONS

| | |
|---|---|
| ABCP | Asset-backed commercial paper |
| AT1 | Additional Tier 1 |
| AT2 | Additional Tier 2 |
| AVC | Asset value contagion |
| BAFJA | 1984 Bankruptcy Amendments and Federal Judgeship Act |
| BCBS | Basel Committee on Banking Supervision |
| BIS | Bank for International Settlements |
| bn | Billion(s) |
| BoE | Bank of England |
| BRRD | Bank Recovery and Resolution Directive |
| CASS | Client Asset Rules |
| CBA | Cost-benefit analysis |
| CCP | Central counterparty |
| CEA | Commodities and Exchange Act |
| CET1 | Core Equity Tier 1 |
| CFTC | Commodity Futures Trading Commission |
| ch/chs | Chapter/chapters |
| CPSS | Committee on Payment and Settlement Systems |
| CRD IV | Capital Requirements Directive IV |
| CRR | Capital Requirements Regulation |
| CSAm | Credit Support Amount |
| CSB | Credit Support Balance |
| CSD | Central Securities Depositary |
| CUA | Custodian Undertaking Agreement |
| DTC | Depositary Trust Company of New York |
| ECB | European Central Bank |
| EFMLG | European Financial Markets Lawyers Group |
| EMIR | European Market Infrastructure Regulation |
| ENG CSA | ISDA Credit Support Annex subject to English Law |
| ESC | Economic and Social Committee |
| ESMA | European Securities and Markets Authority |
| ESRB | European Systemic Risk Board |
| E.U. | European Union |
| FCA | Financial Conduct Authority |
| FCAR | Financial Collateral Arrangements (No. 2) Regulations 2003 |
| FCD | Financial Collateral Directive |
| FCIC | Financial Crisis Inquiry Commission |
| FDIC | Federal Deposit Insurance Corporation |
| Fed | U.S. Federal Reserve System |
| Fed. Reg. | Federal Register |
| FICC | Fixed Income Clearing Corporation |
| FPC | Financial Policy Committee |
| FRBNY | Federal Reserve Bank of New York |
| FSAP | Financial Services Action Plan |
| FSB | Financial Stability Board |

| | |
|---|---|
| FSOC | Financial Stability Oversight Council |
| FWT | First Welfare Theorem |
| GCF | General Collateral Finance repo market |
| GDP | Gross Domestic Product |
| GMRA | Global Master Repurchase Agreement |
| GMSLA | Global Master Securities Lending Agreement |
| G-SIBs | Global Systemically Important Banks |
| G-SIIs | Global Systemically Important Insurers |
| HQLA | High-quality liquid assets |
| ICMA | International Capital Markets Association |
| ICSA | International Central Securities Depositary |
| IOSCO | International Organization of Securities Commissions |
| ISDA | International Swaps and Derivatives Association |
| ISDA MA | ISDA 2002 Master Agreement |
| ISLA | International Securities Lending Association |
| LCR | Liquidity Coverage Ratio |
| LEI | Global Legal Entity Identifier |
| m | Million(s) |
| MBS | Mortgage-backed securities |
| MFA | Managed Funds Association |
| MiFID | Markets in Financial Instruments Directive |
| MiFID II | Markets in Financial Instruments Directive (II) |
| MMMFs | Money market mutual funds |
| MRA | Master Repurchase Agreement |
| MSLA | Master Securities Loan Agreement |
| n/nn | Footnote/footnotes |
| NSFR | Net Stable Funding Ratio |
| NY CSA | ISDA Credit Support Annex subject to New York Law |
| OFR | Office of Financial Research |
| OTC | Over-the-counter |
| p/pp | Page/pages |
| para/paras | Paragraph/paragraphs |
| PSA | Public Securities Association |
| r/rr | Rule/rules |
| reg/regs | Regulation/regulations |
| RMBS | Residential mortgage backed securities |
| s/ss | Section/sections |
| SEC | Securities and Exchange Commission |
| SFD | Settlement Finality Directive |
| SFTs | Securities Financing Transactions |
| SIBs | Systemically Important Banks |
| SICA | Security Interest Collateral Arrangement |
| SIFIs | Systemically important financial institutions |
| SIFMA | Securities Industry and Financial Markets Association |
| SIPA | Securities Investment Protection Act of 1970 |
| SIPC | Securities Investor Protection Corporation |
| TBTF | Too-big-to-fail |
| tn | Trillion(s) |
| TTCA | Title Transfer Collateral Arrangement |
| UCC | Uniform Commercial Code |

| | |
|---|---|
| UCITS | Undertakings in Collective Investments in Transferrable Securities |
| U.K. | United Kingdom |
| U.S. | United States |
| USD | U.S. Dollars |

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# TABLE OF LEGISLATION

## European Union

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# Introduction

In the context of secured transactions, the word "collateral" describes assets over which a right is given by the debtor (the "collateral provider") to a creditor (the "collateral taker") to secure the payment of money or the performance of another obligation.[1] Collateral has the potential to mitigate the collateral taker's counterparty credit risk by transforming it into a series of other risks that may have a lower cost for the collateral taker. In compensation for this mitigation, the collateral taker will pay a "collateral premium" to the collateral provider, which will normally be in the form of a lower cost of capital. In this sense, collateralisation is said to be a Pareto improvement, i.e. an allocation of resources that increases the welfare of at least one party without reducing the welfare of any other party.[2]

[1] The collateral provider does not necessarily have to coincide with the debtor. A third party could secure the debtor's obligation by posting collateral to the collateral taker. However, for the sake of simplicity, I will assume that the debtor and the collateral provider are the same person unless otherwise specified.

[2] See Francesco Parisi, *The Language of Law and Economics : A Dictionary* (Cambridge University Press 2013) 215, 319. For a seminal article arguing the efficiency of secured credit, see Thomas H Jackson and Anthony T Kronman, 'Secured Financing and Priorities among Creditors' (1979) 88 The Yale Law Journal 1143. This argument, however, has been subject to intense criticism. For example, LoPucki contends that it does not acknowledge the impact on the welfare of other parties that may be affected by the collateral provider's decision to collateralise certain obligations; particularly, of those who might not be able to assess the impact of their debtor's decision to collateralise on their credit risk, e.g. its involuntary unsecured creditors, and uninformed or unsophisticated unsecured creditors. See Lynn M LoPucki, 'The Unsecured Creditor's Bargain' (1994) 80 Virginia Law Review 1887. For a criticism of LoPucki's view, see Steve Knippenberg, 'The Unsecured Creditor's Bargain: An Essay in Reply, Reprisal, or Support?' (1994) 80 Virginia Law Review 1967. The efficiency of secured credit has been the object of an intense academic debate, particularly in the U.S. For an overview of this debate, see G McCormack, *Secured Credit under English and American Law* (Cambridge University Press 2004) 22–32. An analysis of the empirical literature on this topic suggests that secured credit is, on the whole, socially beneficial. See John Armour, 'The Law and Economics Debate About Secured Lending: Lessons for European Lawmaking?' (2008) 5 European Company and Financial Law Review.

Collateral has become increasingly important. It underpins some of the most traditional financial products, such as home mortgage loans or project finance transactions, as well as some of the most innovative and complex ones, like structured finance products or derivative contracts. Recent surveys in derivatives markets illustrate the growing reliance of market participants on collateral. For example, in 2000, between 30% and 50% of derivatives trades were covered by a financial collateral arrangement.[3] At the end of 2014, that percentage had risen to around or above 90% for most types of derivatives.[4]

Under some financial contracts, the collateral taker may hold a right to re-use received collateral. This right gives the collateral taker the ability to dispose of the collateral as it thinks fit, subject only to the obligation to return equivalent assets to the collateral provider upon discharge of the latter's obligation. This right is common, for example, in sale and repurchase agreements (or "repos") and securities lending transactions.[5] It is also very common in over-the-counter (OTC) derivatives. For example, at the end of 2014, 82.2%, 52.8% and 26.9% of cash, government securities, and other securities collateral, respectively, had been re-used.[6]

However, the popularity of collateral re-use is a rather recent phenomenon. During the 1980s and 1990s, a series of cases in the U.S. and Europe evidenced the legal uncertainty that surrounded financial collateral arrangements. This uncertainty

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[3] See ISDA, 'ISDA Margin Survey 2001' (2001) 4. The highest degree of collateralisation, as measured by transaction volume, was 88%. See ibid.

[4] According to an industry survey, only commodity derivatives and foreign exchange derivatives were considerably below that level: 59.1% and 73%, respectively. See ISDA, 'ISDA Margin Survey 2015' (2015) 12. It is important to note, however, that the survey did not provide any data on the degree of collateralisation. Nevertheless, recent regulatory proposals in the E.U. and the U.S. aim to make a degree of collateralisation of at least 100% the general rule.

[5] These transactions are often structured as title transfer collateral arrangements, where the collateral taker receives full tile to the collateral assets. The right to re-use that collateral is implicit in the full title. In securities lending transactions, the collateral taker may only receive a security interest in the collateral. In these cases, the parties will need to agree expressly on the conferral of a right to re-use.

[6] See ISDA, 'ISDA Margin Survey 2015' (n 4) 14.

questioned the rights that the collateral taker would have over the collateral assets, particularly in the context of insolvency. In those years, the financial services industry in the U.S. and the U.K. tried to convince regulators to remove that uncertainty on the grounds that protecting the collateral taker's right to dispose of collateral immediately after the collateral provider's filing for insolvency would promote (Pareto) efficiency. They also argued that such protection would support market liquidity and credit growth, and would reduce systemic risk. However, as I shall describe in due course, this rationale was incomplete: it did not take into account the effect that the proposed regulations could have on the very systemic risk they were meant to reduce.

Within the past ten years, several legal scholars have criticised the regulatory reforms that addressed the industry's concerns illustrating how the protection of the collateral taker's right to dispose of collateral immediately after her counterparty has filed for insolvency could increase systemic risk.[7] Nevertheless, albeit indirectly, the same regulatory reforms also protected the collateral taker's right to dispose of collateral *before* her counterparty has filed for insolvency; i.e., the collateral taker's right to re-use. The potential impact on systemic risk of this indirect effect remains unexplored in the academic literature.[8] With this dissertation, I aim to fill that gap.

[7] I provide a detailed analysis of these works in Chapter 4.

[8] There have been very few legal studies on the collateral taker's right to re-use itself. Most of them have focused on its compatibility with general principles of property law. In the U.S., see Christian A Johnson, 'Derivatives and Rehypothecation Failure: It's 3:00 P.M., Do You Know Where Your Collateral Is' (1997) 39 Arizona Law Review 949; Kenneth C Kettering, 'Repledge and Pre-Default Sale of Securities Collateral under Revised Article 9' (1998) 74 Chicago-Kent Law Review 1109. In Europe, see Thomas Keijser, 'Financial Collateral Arrangements : The European Collateral Directive Considered from a Property and Insolvency Law Perspective : An Academic Essay in Law' (Thesis doctoral--Radboud University 2006); Erica Johansson, *Property Rights in Investment Securities and the Doctrine of Specificity* (Springer 2009). Some have referred to the risks that collateral re-use may pose for each of the parties to the transaction, but none have explored whether the right to re-use could have an effect on systemic risk.

The focus of my dissertation will be on securities collateral.[9] In particular, I will provide an analysis of the legal framework that supports the re-use of securities collateral in two markets where collateral re-use is particularly widespread: securities financing and OTC derivatives markets. London and New York are the two main international financial hubs and the vast majority of financial collateral arrangements used to support these transactions is governed by their substantive laws. Hence, I shall also focus my analysis on English and New York State law. Because an important part of English law that applies to financial collateral derives from regulation promoted at the European Union (E.U.) level, the dissertation will also examine specific E.U. legislative acts.

The rest of the dissertation is structured as follows. Chapter 1 presents a conceptual analysis of collateral re-use. First, it introduces the concept and functions of collateral, the different types of financial collateral arrangements, and the different ways of holding a proprietary interest in financial collateral. It then explores the concept of collateral re-use, emphasising in particular the difference between a right to re-use collateral and other rights such as the right to realise collateral upon a counterparty's default, and the right to "re-hypothecate" or "re-pledge" collateral. It also explores how collateral re-use can increase the functionality of collateral beyond the mitigation of counterparty credit risk.

Chapters 2 and 3 introduce securities financing and OTC derivatives markets, respectively, as two case studies in the implications of the re-use of securities collateral for financial stability. Chapter 2 provides a basic description of repo and securities lending transactions and examines the central role that collateral re-use

[9] The re-use of cash collateral is essentially no different than the disposal that banks make of cash in deposit accounts. The possible implications of this type of disposal for systemic risk have been widely explored in the academic literature. I explore some of the main representative works in Chapters 5 and 6.

plays in the modern functioning of these markets. It concludes with a sample transaction to illustrate how such a right to re-use allows collateral to circulate in these markets, thereby linking different market participants along the same "collateral chain". Chapter 3 introduces the second case study: OTC derivatives markets. It provides a basic description of how OTC derivatives markets work and the role that collateral re-use plays in them. In particular, it emphasizes how the practice of re-using collateral may vary depending on whether derivatives are cleared directly on the books of the relevant counterparties, or through a clearinghouse, which will normally stand as a central counterparty (CCP) to each trade. This Chapter also includes a sample transaction to illustrate the circulation of collateral in these markets.

Despite its current popularity, participants in the securities financing and OTC derivatives have not always had the ability to rely on collateral re-use. Chapter 4 examines the main pieces of legislation that protected the collateral taker's right to re-use collateral in the two case studies. It describes the industry's concerns with the uncertainty that surrounded the enforceability of financial collateral arrangements, and the impact of that uncertainty on the collateral taker's right to re-use. Then, it explores how regulators in the United States (U.S.), the E.U. and the United Kingdom (U.K.) addressed these concerns in several legislative interventions. As we shall see, the policy rationale supporting regulatory reforms in these jurisdictions was very similar, and so were their limitations; mainly, an incomplete understanding of the implications that the proposed reforms could have on systemic risk. The Chapter concludes with an analysis of these limitations.

An analysis of the rights and obligations associated with collateral re-use in securities financing and OTC derivatives markets reveals three important facts. First,

the collateral provider's conferral of a right to re-use essentially transforms her proprietary rights over the assets into mere contractual claims. Second, collateral re-use multiplies the number of contractual claims that will be referenced to the same physical asset and thus the number of market participants that will be exposed to changes in that asset's price. I shall refer to this as the "multiplication effect" of collateral re-use. And third, the collateral taker's exercise of her right to re-use will transform her nature: as a result of that exercise, she will stand as both a collateral taker and a collateral provider along the same collateral chain.

Based on these three facts, Chapter 5 describes how collateral re-use can magnify the effect of prices as channels of contagion in securities financing and OTC derivatives markets. Based on the same three facts, Chapter 6 analyses how collateral re-use might affect the incentives of collateral providers and collateral takers in a financial crisis scenario or when a financial crisis is looming. In particular, this Chapter explores the impact of collateral re-use on the incentives of participants in securities financing and OTC derivatives markets to run from their counterparties.

These two Chapters illustrate an important trade-off: while promoting collateral re-use can support market liquidity and credit growth, it can also accentuate systemic risk. Until now, the prevailing regulatory rationale has favoured the former effects; but in the aftermath of the 2007-08 financial crisis, the protection and promotion of financial stability has been driving most regulatory initiatives in financial markets. Indeed, as I write, international bodies such as the Financial Stability Board (FSB), the Basel Committee on Banking Supervision (BCBS), and the International Organization of Securities Commissions (IOSCO), as well as national and regional regulators, are working on the design and implementation of

new rules on financial collateral that will affect the way securities collateral is re-used in securities financing and OTC derivatives markets.

In Chapter 7, I provide an overview of the most recent regulatory strategies and examine the extent to which they could address the systemic risks identified in the previous two chapters, making an emphasis on the advantages and disadvantages of each strategy. In light of this framework, the Chapter concludes with a series of recommendations aimed at informing the current policy debate.

# Chapter 1. Collateral Re-use: Concepts and Functions

## I. Introduction

In the context of secured transactions, the word "collateral" describes assets over which a right is given by the debtor (the "collateral provider") to a creditor (the "collateral taker") to secure the payment of money or the performance of another obligation.[1] The practice of re-using collateral received under one transaction to meet obligations under different transactions is becoming increasingly widespread in modern-day financial markets. However, as its popularity grows, its conceptual precision wanes.

Before describing in greater detail the process through which collateral is re-used in financial markets today, I will provide a brief conceptual analysis of collateral re-use. In Section II, I will examine the concept and functions of collateral, with a particular reference to "financial collateral" and the different types of financial collateral arrangements. In Section III, I will analyse the concept of collateral re-use and distinguish it from concepts that bear certain resemblance, e.g. outright disposals, a statutory right to realise collateral in the event of a counterparty's default, and the right of "re-hypothecation". Section IV concludes.

[1] The collateral provider does not necessarily have to coincide with the debtor. A third party could secure the debtor's obligation by posting collateral to the collateral taker. However, for the sake of simplicity, I will assume that the debtor and the collateral provider are the same person unless otherwise specified.

# II. Collateral as a mechanism to transform counterparty credit risk

## A. Concept and Functions of Collateral

In principle, any type of property can serve as collateral.[2] Generally, however, the range of assets used to collateralise certain financial transactions is narrower, typically including cash and securities (e.g. shares or bonds). Assets used in financial collateral arrangements are often referred to as "financial collateral".[3]

The main function of collateral is to provide the creditor with protection against counterparty credit risk (i.e. the risk that debtor will default).[4] That protection, however, does not rely on the elimination of credit risk. Instead, collateralisation gives the collateral taker the possibility to mitigate the costs associated with counterparty credit risk: in the event of her counterparty's default, the collateral taker can rely on collateral assets to reduce her losses, e.g. by selling the collateral to satisfy her counterparty's obligation against the sale proceeds. The extent of this mitigation will ultimately depend on the costs associated with the collateralisation process itself.

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[2] For example, the vast majority of individuals will borrow money from a bank to buy a house, using that house as "collateral" to secure their obligation to re-pay the bank.

[3] For example, the Directive 2002/47/EC of the European Parliament and of the Council of 6 June 2002 on financial collateral arrangements [2002] OJ L 168/43, as amended (hereinafter, the "Financial Collateral Directive" or "FCD"), specifies that only certain types of financial collateral will fall under its scope of application: cash, financial instruments and credit claims. See FCD, art 1(4). The Financial Collateral Arrangements (No.2) Regulations 2003, SI 2003/3226, as amended (hereinafter, "FCAR"), which implement the FCD in the U.K., use a similar concept. See FCAR, reg 3.

[4] See e.g. Joanna Benjamin, *Financial Law* (Oxford University Press 2007) para 17.08; HG Beale and others, *The Law of Security and Title-Based Financing* (Second edition, Oxford University Press 2012) para 1.06; Royston Miles Goode, *Goode on Legal Problems of Credit and Security* (5th edition, Sweet & Maxwell 2013) paras 6–01.

In order to understand the possible mitigation effect of collateral we need to understand the different costs that the parties will face in a credit transaction. When the credit transaction is unsecured, the creditor will face several costs. *Ex ante*, she will have to assess the creditworthiness of the debtor. Moreover, during the life of the transaction, she will have to monitor the debtor's performance to make sure the latter does not contravene the assumptions on which credit was extended in the first place. These monitoring costs will be incurred regardless of the actual repayment of the loan. They will be reflected in the debtor's cost of capital. In the event of the debtor's default, while the creditor would face the loss of the unpaid principal, the debtor, on the other hand, would face no loss.[5] This could give the latter an incentive to behave opportunistically.[6]

On the other hand, the effect of collateral on counterparty credit risk is twofold. First, it can reduce the probability that a default will materialise. For example, if the creditor takes a proprietary interest in an asset that is essential to the debtor (e.g. essential for her to conduct a business), and she can exert control over that asset, the creditor might be able to reduce the debtor's incentives to resort to an

[5] In order to illustrate the potential effect of collateral on each of the parties' incentives, I shall leave aside the possibility of the creditor seeking repayment in court. As a result, I will not take into consideration any potential losses that the debtor could face in litigation, including the repayment of principal and the payment of the interest accrued in addition to the repayment of principal. Moreover, if the debtor were to borrow money after a default, she might encounter reputational costs, e.g. in the form of higher cost of capital. I have excluded reputational costs from this analysis for the sake of simplicity.

[6] This statement must be read under the assumptions described in the previous footnote. If we relaxed those assumptions, the creditor would probably seek repayment in court. Nevertheless, in that case, the creditor would also need to take into account any potential costs arising from litigation, the probability of being repaid, and the actual amount to be recovered.

opportunistic default.[7] Nevertheless, collateralisation will not eliminate counterparty credit risk: the debtor can always default.[8]

Second, if default were to occur, collateral has the potential to mitigate the cost of a debtor's default for the creditor; e.g., by seizing the collateral, selling it, and using the sale proceeds to satisfy her claim. Nevertheless, when taking collateral, the creditor will face risks other than that of default. First, she will face the risk that her interest in the collateral will not be enforceable, or that another creditor will trump her priority over the proceeds resulting from the sale of the collateral. We shall refer to these risks as "legal risks". Second, even if the creditor's right to realise the collateral is enforceable, she might face operational difficulties when attempting to sell the collateral, e.g. a deficient functioning of the clearing and settlement systems used to transfer securities.[9] I shall refer to these risks as "operational risks". Third, the creditor might face the risk that the market price will go down when she attempts to sell the securities.[10] I shall refer to this risk as "market risk". Finally, the creditor

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[7] See McCormack (Introduction, n 2) 7; Beale and others (n 4) 1.08. In this case, however, the creditor will have to deal with the debtor's incentive to provide an "ugly princess" as a hostage. See n 8.

[8] Some commentators argue that posting collateral might be seen as a positive signal of the debtor's willingness to repay. See Paul AU Ali, *The Law of Secured Finance : An International Survey of Security Interests over Personal Property* (Oxford University Press 2002) para 2.77. In that case, however, the debtor might have an incentive to disregard the quality of the assets she posts, e.g. she may not disclose the existence of a non-registrable superior claim over the collateral asset. In the economic literature, this is often referred to as the "ugly princess" problem: '[If] a king who is known to cherish two daughters equally and is asked, for screening purposes, to post a hostage is better advised to offer the ugly one.' Oliver E Williamson, 'Credible Commitments: Using Hostages to Support Exchange' (1983) 73 The American Economic Review 519, 527. In any event, a positive signal does not exclude the possibility that the debtor might default for reasons beyond its will, e.g. a drop in revenue that leaves her with insufficient resources to meet her obligations.

[9] 'Securities settlement is the process whereby (interests in) securities are delivered, usually against payment, to fulfil contractual obligations, such as those arising under securities trades [and financial collateral arrangements].' Joanna Benjamin, *Interests in Securities : A Proprietary Law Analysis of the International Securities Markets* (Oxford University Press 2000) s 1.67. Clearing follows trading and precedes settlement. '[It] involves modifying contractual obligations so as to facilitate settlement, usually by netting and novation.' ibid 1.77. 'Very broadly, netting is the off-setting of mutual obligations.' ibid. Novation is a technique for transferring contractual claims where an old contract is replaced with one or more new contracts in like terms to the original contract but with different parties. See ibid.

[10] Market risk is particularly acute in the case of securities collateral. For example, if the collateral securities are liquidated in very large orders, these could put downward pressure on the price of the

might face "management risks" associated with the selection and valuation of collateral.[11] In order to assess the probability that these new risks will materialise, the collateral taker will need to incur some costs.

Moreover, when taking collateral, the creditor will incur transaction costs that will be different from those arising under an unsecured transaction. Most notably, there are "specific costs" associated with taking collateral, e.g. those incurred to safeguard and transport the asset.[12] In the specific case of financial collateral, the collateral taker may need to deposit the assets with a custodian bank, for example.

As we can see, collateral will transform counterparty credit risk into a combination of risks. The mitigation effect of this transformation will ultimately depend on two factors: a) the additional costs that the creditor will incur when taking collateral, i.e. specific costs associated with taking collateral, and those associated with the assessment of the probability that the new risks will materialise; and b) the probability that the new risks actually materialise: the lower the probability of these risks, the closer the creditor will be to full compensation in the event of default, and thus, the lesser the concern for the creditor with the debtor's creditworthiness.[13] When the total costs incurred by taking collateral are lower than the total costs incurred in unsecured lending, collateral effectively mitigates counterparty credit

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securities and eventually reduce the amount of cash obtained by the collateral taker. A similar result would occur if the issuer of the securities collateral were to become insolvent.

[11] One evident example is the danger that posted collateral will be correlated with the creditworthiness of the counterparty ("wrong-way risk"). See ICMA, 'Frequently Asked Questions on Repo' (2013) 17 <www.icmagroup.org>. Another example is the infrequent valuation of posted collateral to account for any abrupt drops in market prices, which could result in under-collateralisation, i.e. the value of the collateral being lower than the value of the debt.

[12] These might include storage costs, insurance costs, and delivery costs, among others.

[13] In an ideal scenario, i.e. where there is no probability that these risks will occur, the creditor could disregard the assessment of the debtor's creditworthiness *ex ante* and the monitoring of the latter's performance of the contract. In the event of a default, the creditor would satisfy her claim against the market value of the collateral and would only face the assessment costs. In this situation, there will be a mitigation effect as long as those assessment costs are lower than the costs that the collateral taker would have faced in an unsecured transaction.

risk. In these cases, the creditor will normally pass on some of these costs savings to her counterparty by paying a "collateral premium", e.g. in the form of a lower cost of capital.

## B. Types of Collateral Arrangements

The collateral provider can grant security to the collateral taker by transferring a proprietary interest in an asset that the former 'owns or in which she has an interest[.]' [14] The scope of the interest being transferred can vary. In general, however, it will take one of two forms: the collateral provider can transfer *full ownership* over the assets to the collateral provider, or it can grant the collateral taker *a limited proprietary interest* in the assets (i.e. "security interest"). For the purposes of this dissertation, I will refer to those collateral agreements that grant the collateral taker a security interest as "security interest collateral arrangements" ("SICAs"), and to agreements where the collateral provider transfers the full ownership over the collateral assets to the collateral taker as "title transfer collateral arrangements" ("TTCAs").

Under U.K. law, there are four main types of security interests: i.e. pledges, mortgages, charges and liens. In the specific context of financial collateral arrangements, where collateral is posted mainly in the form of cash or securities, mortgages and charges are the most relevant types of security interests. [15] 'A

[14] Goode, *Goode on Legal Problems of Credit and Security* (n 4) 1–04.

[15] In wholesale financial markets, cash and securities that are indirectly held are normally regarded as pure intangibles, i.e. intangibles which are not "documentary intangibles". According to Goode, documentary intangibles are 'documents embodying title to goods, money or securities such that the right to these assets is vested in the holder of the document for the time being and can be transferred by delivery of the document with any necessary indorsement'. ibid 1–48. 'Security over pure intangibles may be created only by way of mortgage or equitable charge.' ibid 1–07. For a more detailed analysis of these security interests and their categorization under U.K. law, see ibid 1–05 to 1–16. I explain indirect holdings of securities in the next sub-section.

mortgage is a transfer of ownership of the asset (or of any lesser interest held by the transferor) by way of security upon the express or implied condition that ownership will be re-transferred to the debtor on discharge of his obligation.'[16] A charge, in contrast, 'does not depend on either the delivery of possession or the transfer of ownership, but represents an agreement between creditor and debtor by which a particular asset or class of assets is appropriated to the satisfaction of the debt.'[17]

Alternatively, the collateral taker can protect herself from the credit risk of her counterparty by acquiring full ownership of the collateral under a TTCA.[18] Like a mortgage, a TTCA entails the transfer of title over the collateral assets. However, the two must not be confused. In a mortgage, the mortgagor (i.e. collateral provider) retains a *proprietary* interest in the collateral: upon discharge of the secured obligation, the mortgagee (i.e. collateral taker) must return ownership of the mortgaged asset to the mortgagor. This is often known as the "equity of redemption".[19] Conversely, under a TTCA, the transferor (i.e. collateral provider) does not retain any proprietary interest in the collateral: the transferee (i.e. collateral taker) receives full ownership of the asset. Upon discharge of the secured

[16] Goode, *Goode on Legal Problems of Credit and Security* (n 4) 1–54.

[17] ibid 1–55.

[18] Under U.K. law, TTCAs are often categorised as "quasi-security" devices. These devices 'are intended to provide security but do not in law create a security interest.' ibid 1–03. Other examples of quasi-security devices include the reservation of title under a contract of sale and contractual set-off mechanisms. See ibid. Article 6(1) of the FCD requires Member States to 'ensure that a title transfer financial collateral arrangement can take effect in accordance with its terms'. In this sense, see FCAR, reg 3. It is also important to note that under Directive 2014/65/EU of the European Parliament and of the Council of 15 May 2014 on markets in financial instruments [2014] OJ L 173/349 (hereinafter, "MiFID II"), investment firms cannot enter into TTCAs with retail clients. See MiFID II, art 16(10).

[19] Originally, mortgages were a form of outright collateral transfer. However, this often resulted in the unfair treatment of mortgagors, who could forfeit their land to their mortgagees and still remain liable for the repayment of the debt. In the medieval era, the courts developed the equity of redemption to re-characterise the interest of mortgagees as a mere security to protect mortgagors from such unfair consequences. See *Krelinger v New Patagonia Meat and Cold Storage Co* [1914] AC 25, 35.

obligations, the collateral taker only has a *personal*[20] obligation to return "equivalent collateral".[21]

Under U.S. law, the parties can resort to similar security devices. However, unlike the various categories of a security interest identified under English law, U.S. law has adopted a 'unified, generic concept of a security interest' under Article 9 of the Uniform Commercial Code ("UCC").[22] UCC §9-109 defines the scope of application of Article 9 with a broad concept of "security interest" that gives preference to substance over form.[23] The concept covers security interests in securities.[24] These security interests may be perfected upon attachment.[25] Nevertheless, they may also be perfected by "control".[26] Because security interests that are perfected by control will enjoy priority,[27] this is normally the preferred method.

The concept of "security interest" under the UCC covers certain "quasi-security" interests, including certain sale transactions; but the sale of securities is not

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[20] The difference in nature between a property right and a personal right is quite relevant for our purposes. In the former case, the right exists in relation to specific assets and can thus be enforceable against all persons generally. In the latter case, the right is only enforceable against certain persons. See Benjamin, *Interests in Securities* (n 9) 17.05.

[21] In the context of financial transactions, "equivalent collateral" can be broadly defined as collateral of the same type, nominal value, description and amount as the collateral posted by the other party. See e.g. FCD, art 2(1)(i).

[22] See McCormack (Introduction, n 2) 71. The Uniform Commercial Code (UCC) is 'a model promulgated with the expectation that the various states of the U.S. will enact it. Like any uniform law, it must be adopted by a state before it becomes law'. Article 9 of the UCC has been adopted by every state in substantially uniform form.

[23] For the statutory definition of "security interest", see UCC, s 1-201(b)(35).

[24] See UCC, s 9-109(a)(1). Under Article 9 of the UCC, securities are defined as "investment property". See UCC, s 9-102(49). For the purposes of UCC §9-109, investment property is deemed to be personal property.

[25] See UCC, s 9-309(10). Otherwise, notice filing is the standard way of perfecting a security interest. See UCC, s 9-310(a). 'A security interest is said to attach when it becomes enforceable between the creditor and debtor, i.e. it creates an obligation.' McCormack (Introduction, n 2) 73. Perfection makes a security interest effective against third parties. See ibid 76.

[26] See UCC, s 9-314. For a definition of "control" in relation to securities, see UCC, ss 8-106, 9-106.

[27] See UCC, s 9-328(1).

one of them.[28] In principle, this would exclude transfers of securities collateral under a TTCA from the application of Article 9 UCC.[29] In any event, under U.S. law, the main distinction between a SICA and a TTCA still holds: if the collateral provider transfers the collateral taker full title over the collateral assets, the former is deemed to have relinquished her proprietary interest in the collateral and will only have a personal claim against the collateral taker.[30]

### C. Different Ways of Holding a Proprietary Interest in Financial Collateral

Under a SICA, the collateral provider can grant a security interest in cash collateral in different ways. First, it can transfer the funds into an account with a third party bank in the name of the collateral taker.[31] Under U.K. law, if the collateral provider has a right to demand withdrawals from the account, the security interest will probably be characterised as a floating charge;[32] otherwise, it will typically constitute a legal mortgage.[33] Second, the collateral provider can grant a charge over funds held in an account in its own name with a bank that is not the collateral taker.[34] Third, if

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[28] UCC §9-109(a)(3) does cover sales of sale of accounts, chattel paper, payment intangibles, or promissory notes, as defined under UCC §9-102.

[29] As a result, the legal characterization of certain TTCAs as security interests under Article 9 of the UCC has been subject to an intense debate. I will explore this in greater detail in Section III.

[30] See UCC, s 9-318(a). See also Comment 3 to UCC **§**9-314 in American Law Institute and National Conference of Commissioners on Uniform State Laws, *Uniform Commercial Code: Official Text and Comments* (2008 ed, West PubCo 2008) 890.

[31] See e.g. UCC, ss 9-104(a)(3), 9-314.

[32] Depending on the scope of the rights of the collateral provider, the floating charge may not fall under the scope of the FCAR. For a detailed analysis, see Goode, *Goode on Legal Problems of Credit and Security* (n 4) 6–44.

[33] See ibid.

[34] This charge would only fall under the scope of the FCAR if the collateral provider only retains a right to withdraw excess collateral and a right to substitution, although the latter will not be of much use in this case. For a detailed analysis of the application of the FCAR in this case, see ibid 6–44. The European Court of Justice recently confirmed this interpretation in Case C-156/15 *'Private Equity Insurance Group' SIA v 'Swedbank' AS* (CJ, 10 November 2016). Under U.S. law, the bank holding the cash collateral will agree to comply only with instructions from the collateral taker directing

the funds are held in an account with the collateral taker, the collateral provider can grant the former a "charge-back" over that account.[35]

If the collateral provider is a client of the collateral taker, the latter will be required to segregate its assets from those of its client.[36] The collateral taker can segregate the collateral provider's funds in one of two forms: by holding those funds in an omnibus account, where they will be pooled with funds held for all of its clients without distinguishing which funds are held for which client; or by holding them in an individual account, where the client's funds will be held separately from those of the collateral taker, as well as from those of other clients of the collateral taker.

If the collateral is in the form of securities, the specific method used to grant a security interest will depend on how those securities are held. In general, securities may be certificated, i.e. represented by a piece of paper, or uncertificated, i.e. dematerialised.[37] Certificated and uncertificated securities may be held direct with the issuer, or indirect through a securities intermediary.[38] Today, the vast majority of

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disposition of the funds in the relevant deposit account 'without further consent by the debtor[.]' UCC, s 9-104(a)(2). Yet, UCC §9-104(b) clarifies that the collateral taker will be deemed to have control over the cash collateral, and thus enjoy a perfected security interest over it, 'even if the [collateral provider] retains the right to direct the disposition of funds from the deposit account.' See also UCC, s 9-314.

[35] A "charge-back" is one example of a security interest granted by a debtor over her own obligation. For a detailed analysis of charge-backs under U.K. law, see ibid 1–44. In this case, the application of the FCAR will be subject to the existence of certain restrictions over the collateral provider's ability to withdraw funds from the charged account. See ibid 6–44. In relation to U.S. law, see UCC, s 9-104(a)(1).

[36] See MiFID II, art 16(9). In the U.K., similar client asset protection rules will apply as a result of the implementation of the Directive 2004/39/EC of the European Parliament and of the Council of 21 April 2004 on markets in financial instruments [2004] OJ L 145/1 (hereinafter, "MiFID"), and in particular, MiFID art 13(8). See e.g. FCA Handbook, Client Assets Sourcebook ("CASS"), r 7.12.1 R.

[37] In the case of certificated securities, title can derive from registration in the books of the issuer (certificated registered securities) or from possession of the certificate (bearer securities). See Goode, *Goode on Legal Problems of Credit and Security* (n 4) 6–07. Although certificates bearing the name of the holder are issued in relation to both registered and bearer securities, in the former case, those certificates merely represent the registered securities, whereas, in the latter case, the certificate 'is deemed to constitute the debt of the issuer and/or other rights comprised in the security, and not merely to represent them.' Benjamin, *Interests in Securities* (n 9) 2.05–2.08. For certificated registered securities, see Companies Act 2006, art 768. In the U.S., see UCC, s 8-102.

[38] In indirect holding, 'title derives neither from registration in the issuer's register […] nor from possession but from [the investor]'s account with his intermediary'. Goode, *Goode on Legal Problems*

securities are uncertificated and held indirectly through intermediaries,[39] so I will focus my analysis on them in the remainder of the section.[40]

In the case of indirect holdings of securities, 'the investor's rights are derived from a credit to its securities account with a nominee, custodian or other intermediary which itself holds direct from the issuer or from a higher-tier intermediary'.[41] The intermediary will normally be required to segregate its own securities from those held for its clients.[42] It will typically do so by holding its clients' securities in one of two types of accounts: an omnibus account, where the intermediary will hold all securities of a particular issue which it holds for its clients, without distinguishing the specific securities that are held for each client;[43] or an individual account, where the securities held for a specific client will be held

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*of Credit and Security* (n 4) 6–17. Under English law, 'the normal agreement, express or implied, is that the intermediary's holding is as trustee for the investor to the extent of the latter's entitlement'. ibid 6–16.

[39] See Goode, *Goode on Legal Problems of Credit and Security* (n 4) 6–06.

[40] For an analysis of the different ways of holding proprietary interests in directly held securities under U.K. law, see ibid 6–38 to 6–41. For an analysis of the nature of the account holder's interest in directly held securities, see ibid 6–14, 6–15.

[41] Goode, *Goode on Legal Problems of Credit and Security* (n 4) 6–07. For a general description of intermediated securities holding systems and a brief reference to the U.S. market, see Charles W Mooney Jr and Hideki Kanda, 'Core Issues under the UNIDROIT (Geneva) Convention on Intermediated Securities: Views from the United States and Japan' in Louise Gullifer and Jennifer Payne (eds), *Intermediated securities: legal problems and practical issues* (Hart 2010) 72–74.

[42] Under MiFID II, a securities intermediary in an E.U. member state is required to keep its own securities segregated from those of its clients. See MiFID II, art 16(8). In the U.K., see CASS 6.2.1 R, implementing article 13(7) of MiFID. Under U.S. law, see UCC, ss 8-503(a), 8-504(a).

[43] Omnibus accounts reduce administration costs and enable transfers of securities between clients of the same intermediary without the involvement of higher-tier intermediaries. See Goode, *Goode on Legal Problems of Credit and Security* (n 4) 6–08. Under English law, the holder of an omnibus securities account will typically have 'a combination of personal rights (including rights to delivery or transfer of the underlying security) and co-ownership of whatever is held by the intermediary for its customers, whether it holds direct from the issuer or from a higher-tier intermediary'. ibid 6–18. The account holder's intermediary will be the exclusive source of these rights and, therefore, they should be exercisable only through and against that intermediary. Such exclusivity is essential for indirect holdings and pooled funds to work. See ibid 6–19. This position is similar to that of Article 8 of the UCC in the U.S., which describes this bundle of rights as a "securities entitlement". See UCC, art 8, Part 5. In particular, see UCC, s 8-503. The Unidroit Convention on Substantive Rules for Intermediated Securities, signed on 9 October 2009 (hereinafter, the "Geneva Securities Convention"), defines a similar package of rights. See Geneva Securities Convention, arts 9, 24.

separately from those of the intermediary as well as from those of the latter's other clients.[44]

Indirect holdings of securities may be structured with intermediaries at different tiers, thereby creating a chain of account holders and account providers.[45] For example, a first-tier intermediary will hold direct from the issuer of the securities. They will also hold legal title to the securities.[46] Typically, a first-tier intermediary will be a national central securities depositary (CSD) for domestic issues, or an international central securities depositary (ICSD) for international issues. [47] Under U.K. law, any subsequent account holders, e.g. lower-tier intermediaries holding securities for their clients, as well as the clients themselves, will only hold an equitable interest.[48] As a result, any collateral provider holding an equitable interest over the securities will be able to grant an equitable mortgage to the collateral taker by transferring the mortgaged securities to the latter's account.[49]

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[44] The same considerations presented in the previous footnote apply in this case. The identification of securities held in an individual account will be less problematic than when they are held in an omnibus account. Nevertheless, the account provider may still hold the securities in an omnibus account with its own higher-tier intermediary. See Goode, *Goode on Legal Problems of Credit and Security* (n 4) 6–22.

[45] This multi-tier system 'creates a pyramid structure in which the issuer can deal with a relatively small number of large players, who in turn will hold accounts for a greater number of smaller participants, and so on down through the pyramid to the ultimate investor'. ibid 6–07.

[46] In reference to U.K. law, see ibid 6–42. The same rationale applies under U.S. law. See Mooney Jr and Kanda (n 41) 84.

[47] The largest depositary in the world is the Depository Trust Company of New York (DTC). In Europe, the two leading ICSDs are Euroclear Bank and Clearstream. For a more detailed analysis of this multi-tier system, see Goode, *Goode on Legal Problems of Credit and Security* (n 4) 6–07. In the U.K., domestic securities are not held on a CSD but rather through a settlement system (Euroclear UK & Ireland Ltd, formerly CREST) where its members hold direct from the issuer. Those members may also hold securities as intermediaries for their clients. For a detailed analysis of the CREST settlement system, see ibid 6–09.

[48] See Goode, *Goode on Legal Problems of Credit and Security* (n 4) 6–42. A similar logic applies under U.S. law, although, because of the functional approach to "security interests" under Article 9 of the UCC, the reference to "equitable" is irrelevant: 'all entitlement holders, even an intermediary acting in its capacity as such and not for its own account, acquire a pro rata property interest vis-à-vis other account holders of the same intermediary'. Mooney Jr and Kanda (n 41) 84 (footnotes omitted).

[49] If the collateral provider and the collateral taker hold their respective accounts with different intermediaries, the collateral provider's intermediary will transfer the mortgaged securities to the collateral taker's intermediary through a common higher-tier intermediary. If they hold accounts with

The collateral provider may also be able to grant the collateral taker a charge by instructing her intermediary to allow her account to be operated only by the collateral taker, or by transferring the charged securities to a separate account in the name of the collateral provider but under the collateral taker's control.[50]

Under U.S. law, the collateral provider will normally grant a security interest to the collateral taker by instructing her securities intermediary to transfer the relevant securities collateral to the account of the collateral taker.[51] By holding the securities entitlement, the collateral taker will hold control of the securities account and thus the security interest will be perfected.[52]

In relation to TTCAs, if collateral is in the form of cash, it must be transferred into an account in the name of the collateral taker.[53] If the collateral is in the form of securities, the method used to transfer the title to the securities will depend on how those securities are held, like in the case of SICAs.[54] In the case of indirect holdings of securities, the collateral provider will give its account provider the instruction to

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the same intermediary, the transfer can be made directly between their respective accounts. See Goode, *Goode on Legal Problems of Credit and Security* (n 4) 6–42. Alternatively, the collateral provider would also be able to grant a mortgage over the securities by assignment of the relevant account. For a definition of assignment, see n 55. However, if the collateral provider, as account holder, were still permitted to give instructions to the intermediary, the financial collateral arrangement would probably not fall under the scope of the FCAR. A mortgage by assignment may also face additional disadvantages. For a detailed analysis, see ibid.

[50] See Goode, *Goode on Legal Problems of Credit and Security* (n 4) 6–42. For a description of how an equitable charge over shares may be granted in the U.K. through the CREST system, see Benjamin, *Interests in Securities* (n 9) 9.66–9.69. The latter option presents a series of advantages. For example, such control may fulfil the necessary requirements for the charge to fall under the scope of the FCAR, which, as we shall see in Chapter 4, provides a privileged treatment, and it would also provide the collateral taker with a mechanism that is equivalent to publicity. See Goode, *Goode on Legal Problems of Credit and Security* (n 4) 6–42.

[51] See UCC, s 8-507.

[52] See UCC, ss 8-106, 9-314.

[53] See Goode, *Goode on Legal Problems of Credit and Security* (n 4) 6–29. In most cases, if the collateral taker receives cash collateral under a TTCA it will not be required to segregate it from its own funds. See e.g. CASS, r 7.11.1 R.

[54] In any event, if the collateral taker receives securities collateral under a TTCA it will not be required to segregate them from its own assets. See e.g. CASS, r 6.1.6 R.

transfer the relevant securities to the account of the collateral taker.[55] In direct holdings, the parties will need to follow different processes to transfer full title to the securities.[56]

# III. The re-use of collateral: beyond the transformation of counterparty credit risk

## A. A conceptual analysis

The right to re-use collateral can be broadly defined as the right of the collateral taker to lend, re-lend, pledge, re-pledge, sell or otherwise dispose of any such collateral as it thinks fit.[57] In this sense, the collateral taker's right to re-use collateral is equivalent to the buyer's right to dispose freely of the purchased assets. However, there is an important difference between the two: the collateral taker's right to re-use the collateral assets is subject to the obligation to return to the collateral provider the same or equivalent assets upon discharge of the latter's obligations.

[55] The process to transfer full title to securities will be similar to the one described in relation to security interests, i.e. through an in-house transfer or through a common higher-tier intermediary. See n 51. Under U.K. law, although these transfers will normally take place through novation, securities can also be transferred by assignment of the account holder's rights against the account provider. See Goode, *Goode on Legal Problems of Credit and Security* (n 4) 6–29. Technically, novation is not a form of transfer because a new contract is created, thereby giving rise to a new asset, but it has the same economic effects. See Benjamin, *Interests in Securities* (n 9) 3.05. In contrast to novation, in an assignment, the contractual claims remain the same. Moreover, the obligor need not be involved in the assignment. See ibid 3.07–3.20. Nevertheless, transferring securities through assignment rather than novation raises a number of problems. For an analysis of these problems, see Goode, *Goode on Legal Problems of Credit and Security* (n 4) 6–29.

[56] In the case of direct holdings of registered securities, such title may be transferred by execution of a transfer instrument and the transfer will need to be registered in the issuer's books. See e.g. Companies Act 2006, arts 770-775. In the U.K., if securities are uncertificated, the transfer will need to be registered on the CREST system. See Goode, *Goode on Legal Problems of Credit and Security* (n 4) 6–29. In the case of bearer securities, title is transferred by delivery of the relevant certificate. See ibid 6–07. Under U.S. law, see UCC, art 8, Part 3. For certificated registered securities, see UCC, art 8, Part 4. In the U.S., transfers of uncertificated securities will need to be introduced in the DTC registry.

[57] See e.g. ISDA, 'Credit Support Annex Subject to New York State Law' para 6(c)(i). The term "right to use" is also common. See e.g. FCD, art 2(1)(m). In my opinion, however, the prefix "re" emphasizes the fact that the collateral taker is disposing of assets received as collateral under another transaction.

The collateral taker's right to re-use collateral assets must not be confused with the collateral taker's statutory right to realise collateral in the event of her counterparty's default.[58] This latter right is narrower in scope. First, the collateral taker's statutory right to realise collateral does not allow the collateral taker to dispose of the assets in all states of the world: only upon her counterparty's default. Second, the collateral taker will have to use the proceeds of the realisation to satisfy the secured debt. Any proceeds exceeding that amount will have to be returned to the collateral provider.[59] Third, if the collateral provider filed for insolvency, the collateral taker's right to realise collateral might be subject to certain administrative requirements.[60] In sum, the collateral taker's right to re-use collateral is broader in scope and trumps the right to realise collateral: the collateral taker will be able to dispose of the assets as she thinks fit, at any point during the life of the transaction, and free from any procedural requirement.[61]

In commercial contexts, the terms "re-use" and "re-hypothecation" are often used interchangeably.[62] This practice seems to have become ubiquitous.[63]

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[58] Under U.K. law, a right of sale is implied by law. See Royston Miles Goode, *Commercial Law* (3rd ed, LexisNexis UK 2004) 639. If the mortgage is by deed, such a right exists under the Law of Property Act 1925, s 101. For a thorough discussion, see ibid 639–640. In the U.S., see UCC, s 9-610(a).

[59] In the U.K., see Law of Property Act 1925, s 105. In the U.S., see UCC, s 9-615.

[60] For example, the need to obtain the approval of a court or a bankruptcy administrator to realise the collateral. I discuss this and other requirements in greater detail in Chapter 4.

[61] In theory, however, in the event of a counterparty filing for insolvency, the insolvency trustee could avoid the grant of such a right to re-use collateral under certain circumstances. In Chapter 4, we will see that only recently has the collateral taker been able to rely safely on this right to re-use in the context of insolvency proceedings.

[62] See e.g. Geoffrey Yeowart and Robin Parsons, *Yeowart and Parsons on the Law of Financial Collateral* (Edward Elgar Publishing 2016) para 11.01.

[63] International bodies treat the two terms as synonyms. For example, the FSB associates "re-hypothecation" with the collateral provider's transfer of ownership over the assets, which is, technically, a feature of collateral re-use. See e.g. FSB, 'Strengthening Oversight and Regulation of Shadow Banking. Policy Framework for Addressing Shadow Banking Risks in Securities Lending and Repos' (2013) 5 <http://www.financialstabilityboard.org/publications/r_130829b.htm>. The BCBS and IOSCO also understand the right to re-hypothecation in a similar way. See e.g. BCBS and IOSCO, 'Margin Requirements for Non-Centrally Cleared Derivatives' (2015) 19.

Technically, however, "re-hypothecation" is only a synonym of "re-pledging".[64] It is one of the many ways in which the collateral taker can dispose of the collateral assets if it holds a right to re-use and it is, thus, much narrower in scope. To avoid confusion, in the remainder of the dissertation, I will use the term "re-hypothecation" only in this narrower meaning.[65]

Re-hypothecation has been generally defined as the power of the collateral taker to grant a security interest in the received collateral to secure its exposure to a third party.[66] However, the actual scope of this right is far from clear. Under English law, for example, Benjamin understands that re-hypothecation leads to the collateral provider's relinquishment of its equity of redemption over the assets.[67] This also seems to be the prevailing understanding among other legal scholars.[68] Benjamin assumes that such a right to re-hypothecation would not be recognised under English law because it would be deemed incompatible with a series of equitable rules,[69] and

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[64] "Re-hypothecation" is the more elegant terminology coined in the stockbroking profession in the U.S. See Grant Gilmore, *Security Interests in Personal Property.* (Little, Brown 1965) 1159. Today, in the U.S., the term "re-pledge" seems to be preferred. See Kettering, 'Repledge and Pre-Default Sale of Securities Collateral under Revised Article 9' (Introduction, n 8) 1111. The term "pledge", or for that matter "re-pledge", may lead to confusion in the U.K. because, under U.K. law, pledges are possessory security interests and most securities are dematerialised. For the sake of coherence and simplicity, in this dissertation I will avoid the use of the term "re-pledge".

[65] Neither the term "re-hypothecation" nor the broader concept of "re-use" must be confused with the situation in which a debtor grants a security interest in the same property to secure two different obligations that she has vis-à-vis the same or different creditors. This dissertation focuses on the ability of the *collateral taker* to re-use collateral.

[66] See Manmohan Singh, *Collateral and Financial Plumbing* (Risk Books 2014) 2.

[67] See Benjamin, *Interests in Securities* (n 9) 5.64–5.65.

[68] See e.g. Gerard McCormack, 'Security over Shares - Reform Is in the Air' (2003) 3 Insolvency Lawyer 92, 99; Beale and others (n 4) 6.47.

[69] These equity rules aim to protect the collateral provider. In particular, she mentions two. First, the principle "once a mortgage, always a mortgage", and the related rule against clogs on the equity of redemption. Second, the equitable rule against collateral advantages may also impose further restrictions on re-hypothecation. See Benjamin, *Interests in Securities* (n 9) 5.50–5.55. 'This [latter] rule restricts the ability of the mortgagee to obtain in the mortgage agreement an advantage in addition to the payment of interest, costs and principle.' ibid 5.55. Originally, it prevented the mortgagee from obtaining unlawful rates of interests, but after the abolition of the usury laws, the rule mainly precludes collateral advantages which are deemed unfair and unconscionable. See ibid 5.55. According to Benjamin, '[i]t is probably safe to assume that a right of rehypothecation would not be treated as unconscionable, particularly where the collateral giver is a financial institution.' ibid 5.56.

concludes that 'where the collateral taker wishes to use the collateral, the appropriate route is outright transfer.'[70] Under this interpretation, the right to re-hypothecation would be no different than the right to re-use.[71]

This view, however, does not seem to fit current market practices as illustrated by the definitions that the prevailing financial collateral arrangements give of a right to re-use. These definitions include the right to re-hypothecate collateral as part of a broader right to re-use, which effectively allows the collateral taker to dispose of the assets as if she were the owner.[72] This definition of re-use has also been endorsed by the Financial Collateral Directive ("FCD") and the Financial Collateral Arrangements (No.2) Regulations 2003 ("FCAR").[73] If re-hypothecation is one of the several ways in which a collateral taker may dispose of collateral assets, then its scope must be different –and narrower– than that of the broader right to re-use which contains it.

One alternative interpretation would be to consider re-hypothecation as a synonym for sub-security.[74] According to Goode, a sub-security entails the transfer of the relevant security interest coupled with the assignment of the debt that is secured by that interest.[75] This security interest could take the form of a sub-pledge,[76]

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[70] Benjamin, *Interests in Securities* (n 9) 5.66.

[71] See e.g. Beale and others (n 4) 6.46.

[72] See e.g. ISDA, 'Credit Support Deed Subject to English Law' para 6(d).

[73] See FCD, art 2.1(m); FCAR, reg 16(1).

[74] See Johansson (Introduction, n 8) 7.

[75] See Goode, *Commercial Law* (n 58) 645–646; Goode, *Goode on Legal Problems of Credit and Security* (n 4) 1–74.

[76] See Beale and others (n 4) 5.12.

a sub-charge or a sub-mortgage.[77] In the context of financial collateral, only the latter two will be potentially relevant.[78]

The right to create a sub-security is implicit in the collateral taker's security interest and does not require the collateral provider's consent.[79] In principle, the collateral taker cannot grant a sub-security to secure a debt that is larger than,[80] or that has a longer maturity than,[81] the debt that was originally secured by the collateral. Nor can the collateral taker grant a sub-security that is greater than the one it holds.[82] However, Benjamin has argued that structuring re-hypothecation so that the second collateral taker receives a sub-security would not be a practical solution since the collateral taker will generally require a first security interest in respect of its commercial exposures.[83]

Another interpretation would be to regard re-hypothecation as a "qualified" sub-security; i.e., as the collateral provider's consent to the collateral taker granting a sub-security in more stringent terms. For example, a right to re-hypothecation could allow the collateral taker to transfer the security interest to a third party to collateralise an obligation that is larger than, or that has a longer maturity than, the collateral provider's obligation. Similarly, a right to re-hypothecation could allow the

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[77] See Goode, *Goode on Legal Problems of Credit and Security* (n 4) 1–74.

[78] See n 15.

[79] See Goode, *Goode on Legal Problems of Credit and Security* (n 4) 6–46.

[80] For example, in relation to a pledgee's right, see *Donald v Suckling* (1866) L.R. 1 Q.B. 585, 615-6 (Blackburn J).

[81] See Johansson (Introduction, n 8) 81.

[82] For example, a chargee will not be able to sub-mortgage its interest because it would have to transfer the legal title to an asset that it does not own. See Goode, *Goode on Legal Problems of Credit and Security* (n 4) 1–74.

[83] See Benjamin, *Interests in Securities* (n 9) 5.58. If a sub-security implies the transfer of the security interest, however, it is unclear how that security interest would not be a first priority security interest. The rights of the second collateral taker would not be subordinated to the rights of the collateral taker. They would probably not be subject to the rights of the collateral provider either.

collateral taker to grant a security interest in the collateral that is greater than its own interest.

Importantly, however, the conferral and exercise of this right to re-hypothecation would not require the collateral provider to relinquish its equity of redemption in the assets. In principle, the exercise of such a right could impair the collateral provider's equity of redemption.[84] Yet, that equity of redemption would still exist. The collateral provider would have merely agreed not to enforce it against the second collateral taker and, thus, would have assumed the possibility that her equitable right may not be enforceable immediately upon discharge of her obligation.[85]

Nevertheless, if the assets are of a fungible nature, the collateral provider's equity of redemption need not be impaired. For example, upon the latter's discharge of her obligations, the collateral taker would not need to fulfil her obligations vis-à-vis the second collateral taker to redeem the collateral immediately; she could simply acquire equivalent collateral assets and deliver them to the collateral provider.[86] Indeed, most standard financial contracts stipulate that the collateral taker will have such an obligation.[87] Upon discharge of her own obligations vis-à-vis the second

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[84] For example, if the collateral provider discharges its obligation vis-à-vis the collateral taker but the latter cannot redeem the collateral immediately because her debt vis-à-vis the second collateral taker is larger, or has a longer maturity, than the collateral provider's debt.

[85] The scope of the collateral provider's agreement is not *erga omnes*. For example, if the collateral taker were to dispose of the asset in an unlawful manner, e.g. by transferring full title over it, and the second collateral taker knew of the existence of the collateral provider's interest in the assets, the latter could enforce her equity of redemption immediately upon discharge of her obligation.

[86] Benjamin quotes Sargant LJ's discussion of the "once a mortgage" rule in *Ellis & Co's Trustee v Dixon-Johnson* [1924] 2 Ch 451 at 469-71: '[the rule's] application to a case where the mortgaged property or property identical in all material respects therewith is readily purchasable on the market may very well be different to its application to an ordinary mortgage of land. It would be absurd to insist on a retransfer of the identical shares mortgaged when other shares of the same nature are available[.]' Cited in Benjamin, *Interests in Securities* (n 9) 5.63. See also *Crearer v Bank of Scotland* (1922) SC (HL) 137, and *Dixon v London Small Arms Co* (1876) 1 App Cas 632, cited therein.

[87] In relation to securities financing transactions, see e.g. ICMA and SIFMA, 'Global Master Repurchase Agreement' para 1(a); ISLA, 'Global Master Securities Lending Agreement' para 1.1. In

collateral taker, the original collateral taker could hold the collateral assets received from the second collateral taker to compensate for those transferred to the collateral provider. However, if the collateral taker were not able to satisfy her contractual claim against the second collateral taker, the collateral provider could rely on her equitable right. It is important to note, however, that tracing the collateral provider's equitable interest in securities through an indirect holding system can make that equitable right almost irrelevant.[88]

Despite those tracing problems potentially hindering the enforcement of the collateral provider's equity of redemption, such equity of redemption would exist nonetheless. That it may be difficult to enforce is another matter. This is the main difference between the collateral taker's right to re-hypothecation and her right to re-use: the right to re-use will require the collateral provider to waive her equity of redemption so that the collateral taker can enjoy a broader scope of rights, some of which are incompatible with the collateral provider's equity of redemption, e.g., the right to an outright sale.

If the tracing problems are credible, the line between a right to re-hypothecation and a right to re-use may be blurred; but the conceptual distinction will be important in some of the analyses that I will present in the following Chapters. It is important to note that the main factor blurring that line is the fungible nature of the assets that are used as collateral.

In the U.S., §9-207(c)(3) of the Uniform Commercial Code (UCC) stipulates that 'Except as otherwise provided in subsection (d), a [collateral taker] having possession of collateral or control of collateral under Section 9-104, 9-105, 9-106, or

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relation to derivatives, see e.g. ISDA, 'NY CSA' (n 57) 3; ISDA, 'Credit Support Annex Subject to English Law' para 2.

[88] For a detailed analysis of these problems, see Keijser (Introduction, n 8) 183.

9-107: […] (3) may create a security interest in the collateral.' In spite of the existence of an express statutory provision, the actual scope of this right of the collateral taker has also been subject to discussion.

Before the enactment of the UCC, common law rules recognised the right of the collateral taker to grant a security interest in the collateral that would not impair the collateral provider's right of redemption.[89] Under that common law rule, the collateral taker was not able to re-hypothecate collateral to secure a debt larger than, or for a longer term than, that of the collateral provider to the collateral taker.[90] In 1958, Article 9 of the UCC codified that common law rule under UCC §9-207(2)(e).[91] Today, the same statutory right is included under UCC §9-207(c)(3).[92]

Nevertheless, UCC §9-207(c)(3), like its predecessors and the common law rule before them, are only gap-filling provisions; i.e., they would only apply in the absence of the parties' agreement.[93] In other words, the parties are free to agree on the collateral taker's right to re-hypothecate collateral to an extent that impairs the

[89] These common law rules were rooted in "margin lending" practices by stockbrokers during the XIX$^{th}$ century. See Gilmore (n 64) 1158–1159. Under a margin loan agreement, a broker will lend to its customer the funds necessary to purchase securities. The customer will normally secure the loan with a security interest in those securities ("margin securities"). If the broker cannot source the funds in its own books, it will borrow them from a third party. The broker will re-hypothecate the margin securities to secure her obligation vis-à-vis the third party lender. See Kettering, 'Repledge and Pre-Default Sale of Securities Collateral under Revised Article 9' (Introduction, n 8) 1112, 1119.

[90] See Johnson (Introduction, n 8) 974.

[91] See Kettering, 'Repledge and Pre-Default Sale of Securities Collateral under Revised Article 9' (Introduction, n 8) 1118.

[92] The 1999 Revision of Article 9 UCC eliminated the reference to re-pledging without impairing the debtor for the sake of clarity: the debtor's right to redeem collateral upon discharge of the secured obligation is guaranteed under UCC §9-623 and need not be repeated. See American Law Institute and National Conference of Commissioners on Uniform State Laws (n 30) 890. Kettering has criticised the revision for putting a new burden on the collateral provider. See Kettering, 'Repledge and Pre-Default Sale of Securities Collateral under Revised Article 9' (n 8) 1120–1121.

[93] See Kettering, 'Repledge and Pre-Default Sale of Securities Collateral under Revised Article 9' (n 8) 1119.

collateral provider's equity of redemption.[94] Indeed, the Official Comment nº 5 to UCC §9-207 seems to confirm this interpretation: 'By virtue of the [collateral provider (CP)]'s consent or applicable legal rules, [the second collateral taker] typically would cut off [CP]'s rights in investment property or be immune from [CP]'s claims.'[95]

The same Official Comment also suggests that, although the collateral taker's right to re-hypothecation may impair the collateral provider's equity of redemption, its exercise may not eliminate that equitable right, but it may render it unenforceable against the second collateral taker.[96] This interpretation would support the definition of re-hypothecation given above as a "qualified" sub-security: the collateral provider's equity of redemption does not disappear; the collateral provider simply agrees not to enforce it against the second collateral taker.[97]

Despite the broad interpretation of UCC §9-207(c)(3) some uncertainty remains: e.g., whether the collateral provider would be able to renounce its equity of redemption completely. In other words: whether UCC §9-207(c)(3) would fit a broader right to re-use. Most commentators agree that the collateral provider could

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[94] Indeed, before the adoption of the UCC, stockbrokers often obtained an unrestricted right to re-hypothecate their customer's collateral. See ibid. For a more restrictive interpretation of the common law rule, see Johnson (Introduction, n 8) 973–976.

[95] American Law Institute and National Conference of Commissioners on Uniform State Laws (n 30) 890.

[96] 'For example, if the collateral is a negotiable note that the secured party (SP-1) repledges to SP-2, nothing in this section suggests the debtor (D) does not retain the right to redeem the note upon payment to SP-1 of all obligations secured by the note. But, as explained below, the debtor's unimpaired right to redeem as against the debtor's original secured party nevertheless may not be enforceable against the new secured party.' ibid. Johnson adopts a similar position. He understands that the transfer of collateral free of the right of redemption need not imply the waiver of such right. See Johnson (Introduction, n 8) 979.

[97] It is important to note, however, that, under U.S. law, a security interest may be transferred independently from the obligation it secures. Under common law, the sale of the collateral without assigning the debt would normally be regarded as conversion, even in the presence of the collateral provider's agreement. However, re-pledging the collateral and retaining the debt may be regarded as a valid transaction. For a thorough analysis of this issue, see Gilmore (n 64) 1156–1158. Under English law, a sub-security may not decouple debt and security. See n 75.

grant the collateral taker such a broad right to re-use.[98] In fact, the same Official Comment quoted above seems to support this conclusion:

> Moreover, the expectations and business practices in some markets, such as the securities markets, are such that [the collateral taker (CT)]'s consent to [the second collateral taker]'s *taking free of [the collateral provider (CP)]'s right inheres* in [CP]'s creation of [the CT]'s security interest which gives rise to [CT]'s power under this section.[99]

However, the majority of commentators argue that such a broad right to re-use would be characterised as an outright transfer and, thus, fall out of the scope of Article 9 of the UCC.[100] As a result, Article 8 of the UCC would apply.[101]

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[98] According to Gilmore, a broader right to re-use 'would be valid if, on investigation of the business background, [it] appeared to serve a legitimate purpose which justified the sacrifice of the debtor's right to redeem'. ibid 1160. See also Kettering, 'Repledge and Pre-Default Sale of Securities Collateral under Revised Article 9' (Introduction, n 8) 1127–1128. Johnson, however, has a different interpretation. See n 96. UCC §9-207(b)(4)(C) allows the collateral taker to 'use or operate the collateral: […] (C) except in the case of consumer goods, in the manner and to the extent agreed by the debtor.' However, an analysis of previous versions of this provision suggests that the meaning of "use" in that sentence intends to point at uses of the collateral in order to comply with the collateral taker's duty of care when it is in possession (UCC §9-207(a)) rather than to a right to "re-use" as described in this Chapter, i.e. as if it were the owner of the assets. See Gilmore (n 64) 1160–1165. In any event, UCC §9-624(c) recognises the ability of the debtor to waive its equity of redemption.

[99] American Law Institute and National Conference of Commissioners on Uniform State Laws (n 30) 890 (emphasis added).

[100] Gilmore has argued that granting a right to re-use collateral would amount to a separation of the debt from the security, which would violate 'the secured party's inescapable duty to use reasonable care in custody and preservation of the collateral.' Gilmore (n 64) 1156. Johnson has argued that such a broad right to re-use would be incompatible with the collateral provider's right of redemption. However, he does not address the possibility of the latter waiving such right of redemption. See Johnson (Introduction, n 8) 973–976. Kettering has argued that when the collateral taker re-uses the proceeds of the sale for her own purposes there can be no *res* to which the security interest would attach. See Kettering, 'Repledge and Pre-Default Sale of Securities Collateral under Revised Article 9' (Introduction, n 8) 1125–1127.

[101] UCC §8-504(b) recognises the right of a securities intermediary to 'grant any security interests in a financial asset it is obligated to maintain pursuant to subsection (a)' with the agreement of the entitlement holder. The same analysis presented here in relation to the collateral taker's right under UCC §9-207(c)(3) would apply in relation to UCC §8-504(b).

In this context, UCC §9-207(c)(3) could be interpreted so as to recognise the collateral taker's right to re-hypothecate collateral as defined above, i.e. in the form of a "qualified" sub-security, not as a broader right to re-use. Nevertheless, the absence of a statutory provision that recognises such a broader right need not prevent the parties from including it in their agreements.

## B. A functional analysis

The right to re-use allows the collateral taker to dispose of the collateral assets free from the collateral provider's proprietary interests.[102] Such a broad right to re-use will allow the collateral taker to dispose of the collateral for a myriad of purposes; e.g., to sell it or lend it to third parties, or to transfer a full or limited proprietary interest in the collateral to secure other obligations.[103] The collateral provider will only hold a contractual claim against the collateral taker for the return of the same or equivalent assets upon discharge of her obligation. Effectively, that broad power of disposal increases the functionality of the collateral received for the collateral

[102] Nevertheless, a broad right to re-use need not always be incompatible with the collateral provider holding some sort of equitable right. For example, Goode has argued that if the parties agreed on the pre-default sale of collateral the equity of redemption could attach to the proceeds of the sale. See Royston Miles Goode, *Legal Problems of Credit and Security* (3rd ed / Roy Goode, Sweet & Maxwell 2003) 6–30. However, Keijser has questioned the compatibility of such an agreement with the very nature of a security interest given that the collateral provider would be 'faced with entirely different assets upon payment of the secured debt.' Keijser (Introduction, n 8) 207. In the context of indirectly held securities, if an account holder granted her intermediary (i.e. account provider) a security interest over the indirectly held securities that included a right to re-use, and the intermediary were to exercise such right by transferring the securities to a third party, the terms of the agreement could lead to the conclusion that the intermediary would hold her right to claim the return of equivalent securities from her counterparty (i.e. second collateral taker) on trust for the account holder. See *Re Lehman Brothers International (Europe) (In Administration)* [2009] EWHC 2545, [63]-[64]. In some circumstances, the intermediary could even be regarded as holding any collateral received from that counterparty on trust for the account holder. See *Re Lehman Brothers International (Europe) (In Administration)* [2010] EWHC 2914 (Ch) at [240].

[103] Some commentators see in the increased functionality of collateral re-use an opportunity for the collateral taker to reduce the cost of using a third party custodian to act as trustee for the collateral. See e.g. Alastair Hudson, *The Law on Financial Derivatives* (5th ed, Sweet & Maxwell/Thomson Reuters 2012) paras 11–08.

taker.[104] Just as we would expect the collateral taker to pay a "collateral premium" in compensation for the mitigation of her counterparty credit risk, we could reasonably expect the collateral taker to pay a "re-use premium" to the collateral provider in compensation for the additional functions arising from re-use.[105] Such re-use premium will typically be reflected in a lower cost of capital.[106]

Under a TTCA, the right to re-use is implicit in the transfer of *full title* over the collateral assets.[107] In the U.K., Regulation 3 of the FCAR recognises the validity of TTCAs to transfer financial collateral under certain transactions.[108] In the U.S., the use of TTCAs to transfer cash or securities collateral is covered under Article 8 of the UCC.[109]

On the other hand, under a SICA, the parties would need to expressly agree on granting the collateral taker such a right to re-use. In the U.K., Regulation 16 of the FCAR expressly recognises the validity of SICAs that include a right to re-use. Although there is no such statutory recognition for a broader right to re-use in the U.S., it is generally accepted that the conferral of such a broad right to re-use would

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[104] In other words: it reduces the opportunity cost of the collateral taker's holding collateral. See e.g. Cyril Monnet, 'Rehypothecation' [2011] *Business Review (Federal Reserve Bank of Philadelphia)* 18, 21; Annelise Riles, *Collateral Knowledge : Legal Reasoning in the Global Financial Markets* (University of Chicago Press 2011) 168; ISDA, 'ISDA Margin Survey 2013' (2013) 11 <www.isda.org>.

[105] Granting the collateral taker a narrower right to re-hypothecation will increase the functionality of collateral for the collateral taker, albeit in a smaller dimension. Therefore, we could reasonably expect a hypothetical "re-hypothecation premium" to be smaller than a re-use premium. In any rate, these premia would be paid on top of the "collateral premium".

[106] Repos are an illustrative example of TTCAs. Repos tend to be 25 basis points cheaper than the overnight money market rate for lending. See Kathleen Tyson-Quah, 'Cross-Border Securities Collateralisation Made Easy' (1996) 11 Butterworths Journal of International Banking and Financial Law 177, n 5. In the context of derivatives products, see ISDA, 'ISDA Margin Survey 2015' (Introduction, n 4) 13.

[107] 'The right of use and disposal of financial collateral are no more than incidents of ownership.' Yeowart and Parsons (n 62) 11.03.

[108] See also FCD, arts 1, 6.

[109] Transfers of indirectly held securities are governed by Part 5 of Article 8. In particular, see UCC, ss 8-501, 8-503.

be possible.[110] Nevertheless, most commentators agree that a right to re-use would be incompatible with the nature of a security interest, and that the transaction could be characterised as a TTCA.[111]

Although TTCAs and SICAs that include a right to re-use do provide a similar economic function, there are at least two important differences between them. First, the necessity to reach an express agreement over the right to re-use under a SICA will give the parties more flexibility to define the scope of such right. For example, the parties can choose to grant the collateral taker a right to re-use only certain collateral assets, or they can decide to reduce the scope of the right to re-use to one of mere re-hypothecation.[112] Under a TTCA, a broad right to re-use is implicit in the full title transferred and will affect *all* collateral assets.

Second, in the case of TTCAs, the transfer of collateral becomes effective when the contract is executed. However, when the collateral taker holds a right to re-use under a SICA, under the prevailing opinion, the transfer of collateral will only become effective upon the collateral taker's actual exercise of the right to re-use. Until then, the collateral provider is deemed to retain an interest in the collateral, i.e. an equity of redemption.[113] Upon the exercise of such right, the collateral provider

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[110] See n 100.

[111] See ibid.

[112] If we understand the right to re-hypothecation as different from the right to re-use.

[113] See e.g. FCAR, reg 16(2); FCD, art 5(2). Also, in support of this view, see Richard Potok, *Cross Border Collateral : Legal Risk and the Conflict of Laws* (Butterworths 2002) para 2.6; Beale and others (n 4) 6.53.

See also *Re Lehman Brothers International (Europe) (In Administration)* [2009] EWHC 2545, [64]. It is important to note that, under this interpretation, the actual scope of the collateral provider's interest in the collateral will depend on the collateral taker's willingness to exercise her right to re-use. This could expose the former to considerable uncertainty. For example, if, before the collateral provider discharges her obligation, the collateral taker first re-uses the collateral assets under a TTCA and, subsequently, it re-uses them under a SICA with no right to re-use, the collateral provider may be uncertain about the actual extent of her rights in the assets and the application of any client protection rules. It is important to note that any client asset protection rules will no longer apply after the collateral taker's exercise of her right to re-use. See CASS, r 3.2.3 R, 7.11.6 R. Moreover, determining the moment when ownership of the assets is effectively transferred will be important in

will only have a contractual claim against the collateral taker for the return of the same or equivalent assets.[114]

## IV. Conclusion

Before exploring the re-use of collateral in modern-day financial markets, in this first Chapter I have provided a detailed analysis of the collateral taker's right to re-use: its scope, its functions, and how it might be distinguished from other legal terms that can seem very similar.

For the purposes of this dissertation, distinguishing between a right to re-use and a right to re-hypothecate is particularly important. A right to re-hypothecate gives the collateral taker the opportunity to create a "qualified" sub-security in the collateral by impairing the collateral provider's equity of redemption, but without eliminating it. A right to re-use, on the other hand, is much broader in scope. It gives the collateral taker the right to dispose of collateral as if she were the owner. Thus, she can not only re-hypothecate the collateral, but also lend it or transfer its full title under a TTCA or an outright sale. Unlike in the case of re-hypothecation, however, when the collateral provider grants a right to re-use, she effectively relinquishes any proprietary rights in the assets.

With this conceptual framework in mind, in the next two Chapters I will describe how collateral is re-used in two specific markets: securities financing markets and over-the-counter derivatives markets. As I shall describe, the collateral

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order to establish who is entitled to exercise voting rights and receive income payments. See Johansson (Introduction, n 8) 17. Some commentators have argued the need to re-characterise SICAs that include a right to re-use as outright transfers. See n 70. Indeed, in light of those uncertainty problems, if the parties are considering the use of a SICA with a right to re-use, they could simply rely on TTCAs instead.

[114] See e.g. FCAR, reg 16(2); FCD, art 5(2).

taker's right to re-use collateral allows us to better understand how these two different markets work today.

# Chapter 2. Collateral Re-use in Securities Financing Transactions

## I. Introduction

Sale and repurchase agreements ("repos") are perhaps the most illustrative example of a title transfer collateral arrangement (TTCA). Under a repo, one party agrees to sell to the other a portfolio of securities, and to repurchase the same or an equivalent portfolio of securities at a later date. In essence, the securities portfolio serves as collateral to secure the obligation to repurchase it at a later date. Because the party purchasing the collateral will have an obligation to return a portfolio of the same or equivalent securities, the effects are similar to those of a TTCA. As a result, the "repo buyer" will have an implicit right to re-use the securities collateral, as described in the previous Chapter.

In recent years, the growth of repo markets has been extraordinary. According to the European Repo Market Surveys developed by the International Capital Markets Association (ICMA), only in Europe, the total value of outstanding repo contracts grew from €1.83 trillion in June 2001[1] to €5.32 trillion in June 2005.[2] Since June 2005, the total value of outstanding repos has remained more or less constant, with peaks of activity at various points before and after the 2007-08

[1] See ISMA, 'ISMA European Repo Market Survey June 2001' (2001) 6.

[2] See ICMA, 'European Repo Market Survey (June 2016)' (2016) 7.

financial crisis.[3] As of June 2016, the total value of outstanding repos was €5.38 trillion.[4] The level has remained more or less constant for the past three years.[5] In the U.S., the Office of Financial Research (OFR) has estimated the size of the repo market as of September 2005 in $USD3.42 trillion.[6]

As of June 2016, 10.8% of the repo activity reported under the ICMA market surveys corresponded to securities lending transactions.[7] That is approximately €580bn. According to the OFR, as of June 2015, the market value of securities on loan globally was approximately $USD1tn, although they identify several problems that make an accurate estimation very difficult.[8]

Under a securities lending transaction, one party makes a temporary transfer of securities to another for a fee. The party borrowing the securities will normally collateralise the transaction by posting cash or securities collateral. The economic function of these transaction sis very similar to that of repos. Indeed, as the ICMA market surveys reveal, banks often traded these products from the same desks. Securities lending transactions, however, are typically driven by the desire to borrow securities rather than cash, and may be collateralised with cash or securities collateral. They also tend to be documented using different standard agreements than those used in repos.[9] Some of the standard agreements used to document these

[3] As of June 2007, the total value of outstanding repos was €6.78tn. See ibid.

[4] See ibid 4.

[5] See ibid 7.

[6] See Victoria Baklanova, Adam Copeland and Rebecca McCaughrin, 'Reference Guide to U.S. Repo and Securities Lending Markets' (2015) OFR Working Paper no. 15-17 17. Nevertheless, the OFR acknowledges that this is a rough estimation due to the lack of data in some segments of the market.

[7] See ICMA, 'European Repo Market Survey (June 2016)' (n 2) 23.

[8] See Baklanova, Copeland and McCaughrin (n 6) 26.

[9] I will examine each of these differences in greater detail later in the Chapter.

transactions take the form of TTCAs.[10] Others are structured as SICAs, and often include a right to re-use.[11]

The ICMA market surveys do not collect data about the actual re-use of received collateral. Nevertheless, there are reasons to believe that the rate of re-use in these markets can be quite high. As I shall describe later in the Chapter, intermediaries in these markets rely greatly on their right to re-use collateral to finance their clients' transactions. Thus, the total volume of outstanding transactions gives us an idea of the potential that collateral re-use has in these markets.

The regulation of financial collateral in securities financing markets as part of the G-20 agenda is still unfinished. For example, in August 2013, the FSB proposed a series of reforms that will affect the way collateral is re-used in these markets.[12] Nevertheless, as of December 2016, regulators in the E.U. and the U.S. have not implemented these recommendations yet. Because the regulation of collateral re-use in these markets remains, at least, an open question, the analysis in this Chapter ignores these recent regulatory proposals. I will examine them in Chapter 7, as part of a broader analysis of policy implications.

In Section II, I will describe the role that collateral re-use plays in repo markets. I will pay particular attention to the role of securities dealers in these markets, who are able to intermediate between institutional investors in need of cash resources and cash-rich entities, thanks, largely, to the dealer's right to re-use received collateral. In Section III, I will explore the role of collateral re-use in securities lending markets, with a similar focus on securities dealers, who rely on

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[10] See e.g. ISLA (ch 1, n 87).

[11] See e.g. SIFMA, '2000 Master Securities Loan Agreement' s 4.2. Section III explores in greater detail some of the restrictions that may apply to the right of re-use under this standard document.

[12] See FSB, 'Strengthening Oversight and Regulation of Shadow Banking. Policy Framework for Addressing Shadow Banking Risks in Securities Lending and Repos' (ch 1, n 63).

their right to re-use received collateral to provide intermediation functions for market participants in need of specific securities. In Section IV, I will present a sample transaction to illustrate the collateralisation process in these markets. Section V concludes.

## II. The role of collateral re-use in repo markets

A sale and repurchase transaction (or "repo") is the sale of a portfolio of securities with the agreement to repurchase these or equivalent securities at a later date and at a given price.[13] A repo is thus comprised of two legs: the opening leg, where one party (the "repo seller") sells a portfolio of securities to another (the "repo buyer"); and the closing leg, where the former party repurchases a portfolio of the same or equivalent securities from the latter party. The difference between the sale and the repurchase price represents the interest on the cash loaned and it is often known as the "repo rate". From the point of view of the repo buyer, the transaction is often referred to as a "reverse repo".

Repo transactions may be classified based on differences in settlement. Bilateral repos settle on the books of the two parties to the transaction, i.e. each counterparty's custodian is responsible for the clearing and settlement of the trade.[14] On the other hand, tri-party repos settle on the books of a clearing bank where both

[13] Those securities collateral may be of a "general" type, i.e. securities perceived to have a very low credit risk and which will typically have a very high repo rate, or "special", i.e. securities with an intrinsic value that the repo buyer will try to monetise and for which it will normally receive a lower repo rate. See Darrell Duffie, 'Special Repo Rates' (1996) 51 The Journal of Finance 493.

[14] In the U.S., the size of bilateral repo as of September 2015 has been estimated at $USD1.58tn. According to market sources, a significant share of bilateral repo is inter-dealer activity. Moreover, the vast majority of reverse repo activity seems to be bilateral. See Baklanova, Copeland and McCaughrin (n 6) 17. In Europe, the total value of repos outstanding on the books of surveyed institutions as of June 2016 was €5.38tn. However, this number includes double counting. Approximately 46% of those transactions were traded in the bilateral repo market. See ICMA, 'European Repo Market Survey (June 2016)' (n 2) 8–10.

parties hold an account.[15] Bilateral repos present some operational complexities, particularly for the party receiving the collateral securities. For example, she must keep track of the collateral she receives, make sure that the collateral is adequate and valued correctly, and ensure that the proper haircut[16] has been applied. Clearing banks that operate the tri-party repo platform will provide both parties with back-office support to handle those complexities for a fee.[17]

When negotiating a bilateral repo, the parties will agree on the terms of the trade, including the sale and the repurchase price, the type of securities to be delivered, their haircut, and the maturity of the repo. In tri-party repo transactions, the repo buyer will normally agree to accept as collateral any securities within an asset class, which will typically be of the "general" type.[18]

In repo markets, equity collateral is rarely used.[19] Debt collateral dominates, and, in particular, sovereign debt.[20] In tri-party repo markets, public debt securities[21]

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[15] In a tri-party repo, the clearing bank acts an agent, not a principal. See Baklanova, Copeland and McCaughrin (n 6) 11. Until very recently, two clearing banks handled tri-party repos in the U.S.: Bank of New York Mellon (BNYM) and JP Morgan Chase (JPMC). The latter, however, has announced that it will stop settling repo transactions within the next eighteen months. See Joe Rennison, 'Treasury Market Plumbing in Focus as JPMorgan Pulls Back' *Financial Times* (12 October 2016) <https://www.ft.com/content/bf6bd6d8-81ed-11e6-bc52-0c7211ef3198> accessed 20 December 2016. The size of the tri-party repo market in the U.S. as of September 2015 has been estimated at $USD1.84tn. See Baklanova, Copeland and McCaughrin (n 6) 17. Much of the tri-party repo activity corresponds to institutional cash pools contracting with securities dealers. See Manmohan Singh, 'Velocity of Pledged Collateral: Analysis and Implications' (2011) IMF Working Paper 11/256 12 <http://www.imf.org/external/pubs/cat/longres.aspx?sk=25332.0>. In the European tri-party repo markets there are four tri-party agents: Euroclear, Clearstream, BNYM and JPMC. Out of the total volume of repo contracts outstanding as of June 2016 (i.e. €5.38tn), 10% was traded in the tri-party repo market. See ICMA, 'European Repo Market Survey (June 2016)' (n 2) 9–10.

[16] Haircuts represent the amount of over-collateralisation that permits a collateral taker to receive collateral assets the market value of which is greater than the value of the obligation they secure. Sometimes they are also referred to as "margins". For an example of how haircuts operate, see Section IV.

[17] See Adam Copeland and others, 'Key Mechanics of the U.S. Tri-Party Repo Market' [2012] *FRBNY Economic Policy Review* 2.

[18] In the context of repo markets, "general" securities are those perceived to have a very low credit risk and which will typically have a very high repo rate. See n 13.

[19] In Europe, as of June 2016, only 0.1% of all collateral was equity securities. See ICMA, 'European Repo Market Survey (Dec. 2015)' (2016) 13. Equity collateral is more popular in securities lending markets.

are in great demand, but other debt securities, as well as equity securities, take an important share.[22] At least in the European repo markets, these trends appear to be quite stable within the last six years.[23]

The Master Repurchase Agreement (MRA), governed by New York Law, and the Global Master Repurchase Agreement (GMRA), governed by English law, are the two most common standard agreements used to document repo transactions. They have been prepared by the Securities Industry and Financial Market Association (SIFMA), and jointly by the SIFMA and ICMA, respectively. In the U.S., repo dealers use the MRA with U.S. counterparties and the GMRA with non-U.S. counterparties.[24] In Europe, the GMRA prevails.

Both the MRA and the GMRA take the form of TTCAs. The repo seller will transfer full title over the portfolio of securities to the repo buyer, and the repo buyer will transfer full title over the cash delivered as the "purchase price".[25] As holders of

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[20] In Europe, for example, as of June 2016, more than 90% of all collateral was in the form of sovereign debt, primarily from eurozone states (55.1%) and the U.K. (12.1%). The rest corresponded to "other fixed income" securities (6.0%) and debt securities from international financial institutions (1.6%). See ibid.

[21] By public debt securities I mean debt securities issued by national and sub-national governments, public agencies and supranational agencies.

[22] In particular, in Europe, as of June 2016, corporate bonds (16.0%), covered bonds (10.5%) and equities (7.3%) were among the most popular securities collateral. See ICMA, 'European Repo Market Survey (June 2016)' (n 2) 15. We observe a similar trend in the U.S. markets, where U.S. Treasuries and agency mortgage-backed securities (MBS) dominate, but corporate debt and equities are also in demand. See Baklanova, Copeland and McCaughrin (n 6) 16. In the GCF Repo market, however, these latter types of securities are in relatively low demand. See ibid 15.

[23] See ICMA, 'European Repo Market Survey (Dec. 2015)' (n 19) 16. Equity collateral appears to have been more popular in previous years, but this may be due to a correction in the reporting standards. See ibid 10.

[24] See Baklanova, Copeland and McCaughrin (n 6) 23.

[25] See ICMA and SIFMA (ch 1, n 87) 6(e), 6(f); Securities Industry and Financial Markets Association, 'Master Repurchase Agreement' paras 1, 6. Normally, cash will be transferred into an account in the name of the repo seller. If the collateral is in the form of securities, title transfer will require an entry on the company register (if securities are certificated) or the CREST register (if uncertificated). In the case of intermediated securities collateral, title will be transferred to the repo buyer's account with its intermediary (i.e. by novation). In this latter case, a title transfer by assignment would face several problems. See Goode, *Goode on Legal Problems of Credit and Security* (ch 1, n 4) 6–29.

a full title, the parties can dispose of received assets as they deem fit.[26] Upon termination of the transaction, they need not return the same assets: the repo buyer can transfer full title over a portfolio of "equivalent"[27] securities to the repo seller, and the latter will transfer full title over cash delivered as the "repurchase price".[28]

The repo seller will be able to dispose of the cash received as it deems fit. The full title over the portfolio of securities that the repo seller will transfer to the repo buyer will effectively serve as security in case the former fails to comply with its repurchase obligation. In receipt of full title over the securities collateral, the repo buyer will be able to dispose of them as it thinks fit, subject only to the obligation to return equivalent securities upon termination of the transaction.[29]

Repo buyers typically include institutions with large cash pools, e.g. money market mutual funds, securities lenders,[30] corporate treasuries, as well as financial institutions such as banks, securities dealers, and equities and derivatives exchanges.

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[26] Indeed, as of 28 February 2013, 98% of collateral received under repo transactions in Europe was eligible for re-use. See Joachim Keller and others, 'Securities Financing Transactions and the (re)use of Collateral in Europe' (2014) ESRB Occasional Paper Series No. 6 16.

[27] In general, equivalent assets are those of a similar nature to the ones previously received. See Guy Morton, 'Commentary on "The Dematerialisation of Money Market Instruments"' in Sarah Worthington (ed), *Commercial law and commercial practice* (Hart Publishing 2003) 300. For example, under the GMRA, equivalent securities need to be of the same issuer, part of the same issue, and of an identical type, nominal description, value and amount. See ICMA and SIFMA (ch 1, n 87) 2(v).

[28] See ICMA and SIFMA (ch 1, n 87) 3(f). The MRA does not include any express reference to the right of the repo buyer to return equivalent securities. However, such a right seems implicit in the repo buyer's right to dispose of the securities collateral as it deems fit. See Securities Industry and Financial Markets Association, 'MRA' (n 25) 8. Cash will be transferred into an account in the name of the repo buyer. The specific method to transfer equivalent securities will depend on how these are held. See n 25.

[29] For a description of how a repo transaction may be driven by the desire of the repo buyer to borrow particular securities, see Duffie (n 13) 497–505. The owner of those particular securities may agree to lend them if the interest rate under this "special" repo is lower than the interest rate that the repo seller could obtain under a general repo if it were to re-lend the cash received. See Michael J Fleming and Kenneth D Garbade, 'Dealer Behavior in the Specials Market for US Treasury Securities' (2007) 16 Journal of Financial Intermediation 204, 207.

[30] In a securities lending transaction, the securities borrower may transfer cash collateral to the securities lender to secure her obligation to return equivalent securities upon termination. The securities lender, in turn, may reinvest such cash collateral in assets such as repos. For a detailed analysis, see Section III below.

The collateralised nature of repos leads repo buyers to regard these transactions as relatively safe opportunities to invest their cash resources.[31] Moreover, the implicit right to re-use the received securities collateral will allow repo buyers to dispose of those securities for their own purposes, e.g. to collateralise their obligations under different transactions, to lend them in order to make an additional return, or even to sell them. This right to re-use makes bilateral repo markets particularly attractive to some repo buyers (mainly, securities dealers), who may use collateral received under a bilateral repo to build their stock of securities (which they will use to develop their market making activities[32]) or to meet their settlement obligations in other transactions.[33] Most repo buyers, however, turn to the tri-party platform to avoid operation difficulties.[34] In tri-party repo markets, securities collateral normally remains in the custody of the clearing bank and cannot be re-used outside the tri-party settlement platform.[35] Yet, some repo buyers (e.g. asset managers) may re-use securities collateral to increase returns in order to fulfil their mandates.[36]

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[31] See Zoltan Pozsar and Manmohan Singh, 'The Nonbank-Bank Nexus and the Shadow Banking System' (2011) IMF Working Paper 11/289 7–8. Repo buyers may not have access to central bank reserves, or may have cash holdings that largely exceed deposit insurance limits. See FSB, 'Securities Lending and Repos: Market Overview and Financial Stability Issues' (2012) Interim Report 5 <http://www.financialstabilityboard.org/list/fsb_pa/tid_150/index.htm>. The receipt of securities collateral can effectively serve as security for repo buyers if the repo seller defaults on her obligations, particularly when the former's exposure is over-collateralised.

[32] Dealers intermediate in the secondary market among investors by standing ready to buy or sell certain securities. For a succinct description of these market making activities, see Darrell Duffie, 'The Failure Mechanics of Dealer Banks' (2010) 24 Journal of Economic Perspectives 51, 55.

[33] See Pozsar and Singh (n 131) 9.

[34] See Baklanova, Copeland and McCaughrin (n 6) 20.

[35] See ibid 11. Custodians, however, may offer collateral management services to their clients, which may include support to re-use collateral. See e.g. Clearstream and Elton-Pickford, 'Collateral Optimisation' (2014) <http://www.clearstream.com/blob/66616/9250c222407c9aad032ff51f8e4befa3/eltonpickford-data.pdf> accessed 20 December 2016.

[36] See Singh, 'Velocity of Pledged Collateral: Analysis and Implications' (n 15) 4. Asset managers specialise in the management of retail investor's financial assets and make investments on their behalf. For a succinct analysis of the role of asset managers in financial markets, see John Armour and others, *Principles of Financial Regulation* (Oxford University Press 2016) 36–38. Other repo buyers may seek to re-use securities collateral in the future as a result of a higher demand for that type of

Some central banks often conduct their temporary market operations through repo and reverse repo transactions with certain financial institutions.[37] For them, rather than a safe investment opportunity or a source of finance, repos are a means of implementing monetary policy.[38] It is for this very reason that central banks sometimes impose limitations on their counterparties' ability to re-use received collateral.[39] Normally, these repo transactions are settled through a tri-party arrangement.[40]

Repo sellers enter into repo contracts to finance their investment activities.[41] Banks and securities dealers are among the largest repo sellers in the market.[42] They

collateral in other markets, e.g. OTC derivatives markets. See FSB, 'Securities Lending and Repos: Market Overview and Financial Stability Issues' (n 31) 29.

[37] Typically, central banks will enter into repo and reverse repo transactions with primary dealers and institutions subject to minimum reserves. See ECB, 'The Eurosystem's Instruments' <https://www.ecb.europa.eu/mopo/implement/html/index.en.html>. However, other institutions such as money market mutual funds ("MMMFs"), banks, and government-sponsored enterprises may be allowed to participate if they meet specific eligibility requirements. See Baklanova, Copeland and McCaughrin (n 6) 21.

[38] Central banks can use repos and reverse repos to increase or decrease the reserve account of a bank (i.e. to create or withdraw a central bank liability). See Paolo Fegatelli, 'The Role of Collateral Requirements in the Crisis: One Tool for Two Objectives?' (Banque Centrale du Luxembourg 2010) Working Paper nº 44 6. The main refinancing operations (MROs) are the main tool of the European Central Bank (ECB) for liquidity management and normally have a frequency and maturity of one week. '[They] serve to steer short-term interest rates, to manage the liquidity situation and to signal the monetary policy stance in the euro area[.]' ECB, 'Open Market Operations' <https://www.ecb.europa.eu/mopo/implement/omo/html/index.en.html>. Long-term refinancing operations (LTROs) are less frequent term repo operations with maturities ranging between three and forty-eight months. See ECB, 'The Eurosystem's Instruments' (n 37). The Bank of England (BoE) uses similar term repo facilities, e.g. the Indexed Long-Term Repo Facility (ILTR) and the Contingent Term Repo Facility (CTRF). For more details about these instruments, see Bank of England, 'Indexed Long-Term Repo Open Market Operations' <http://www.bankofengland.co.uk/markets/Pages/money/ltomo/default.aspx>. For details about the use of reverse repurchase agreement operations by the Federal Reserve Bank of New York, see Federal Reserve Bank of New York, 'FAQs: Reverse Repurchase Agreement Operations' <https://www.newyorkfed.org/markets/rrp_faq.html>.

[39] For example, a central bank may enter into several repo transactions to reduce the amount of money that there is in circulation, with the intention of "cooling down" the economy. For that purpose, the central bank may restrict its counterparty's right to re-use securities collateral received under a repo in order to prevent her from raising finance against that collateral.

[40] See Federal Reserve Bank of New York, '2015 Annual Report' (2016) 19 <https://www.newyorkfed.org/medialibrary/media/aboutthefed/annual/annual15/report.pdf>.

[41] See Baklanova, Copeland and McCaughrin (n 6) 20.

[42] See FSB, 'Securities Lending and Repos: Market Overview and Financial Stability Issues' (n 31) 4.

may actually borrow from each other in inter-dealer repo transactions.[43] Securities dealers may also enter into repos to provide collateralised finance to their institutional clients, e.g. hedge funds and other leveraged investment funds.[44] They will normally do so as part of their prime brokerage services.[45] Typically, the fund will grant the dealer a right to re-use its assets, which the dealer will exercise to collateralise a repo transaction in the tri-party repo market.[46] Subsequently, the dealer will transfer the cash received from the repo lender in the tri-party market to its institutional client under a bilateral repo. In so doing, the securities dealer stands as a "cash intermediary" between lenders and borrowers, allowing for the allocation of excess cash resources to different parts of the financial system.[47]

Central counterparties ("CCPs") play a similar role as cash intermediaries in certain inter-dealer repo transactions. In the U.S., inter-dealer repo transactions may be executed in bilateral or tri-party repo markets. In the latter case, they normally take place in the General Collateral Finance (GCF) repo market, where netting

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[43] These transactions may take place in the bilateral or tri-party repo market. In the U.S. and Europe, the latter option tends to dominate. For an overview of inter-dealer repo markets, see ibid 3–4, 26–28.

[44] For an overview of how hedge funds rely on repos to fund their investment strategies, see Singh, 'Velocity of Pledged Collateral: Analysis and Implications' (n 15) 6–8.

[45] 'Prime brokers are typically large investment banks or securities firms that offer services such as derivatives trading, margin and stock lending, and arranged financing [e.g. through repos] to their clients, most of whom are hedge funds.' Alarna Carlsson-Sweeney, 'Trends in Prime Brokerage' [2010] *Practical Law Journal* 60. In the U.S., Federal Reserve Board Regulation T (12 C.F.R. ss 220.1 to 220.12) and SEC Rule 15c3-3 (17 C.F.R. s 240.15c3-3) limit the amount of a client's assets that the prime broker will be allowed to re-use to assets with a market value of up to 140% of the client's liabilities towards the prime broker. See e.g. 17 C.F.R. s 240.15c3-3(a)(5), (e), (f). In the U.K., there is no similar restriction, although current market practice suggests that institutional clients are starting to request that similar limitations are introduced in the relevant contracts. See e.g. ibid 64.

[46] Like in the case of repos, a prime broker re-using its clients' assets will have an obligation to return equivalent assets. Carlsson-Sweeney (n 45) 60. According to Baily et al, the importance of the right to re-use a client's assets for the prime broker relies on two grounds: i) re-using customers' cash to make a loan to another customer; ii) re-suing a customer's securities to finance a cash loan to that customer. See Squam Lake Working Group on Financial Regulation, 'Prime Brokers and Derivatives Dealers' (2010) Council on Foreign Relations Working Paper 3 <http://www.cfr.org/financial-crises/prime-brokers-derivatives-dealers/p21843>.

[47] Bilateral repos are normally settled before tri-party repos. Such lag allows securities dealers to dispose of collateral received in a bilateral repo to collateralise a tri-party repo transaction. See Copeland and others (n 17) 2, 8.

members of the Fixed Income Clearing Corporation (FICC) trade cash and securities among themselves on negotiated rates and terms.[48] In the GCF repo market, the FICC stands as a CCP, serving as the legal counterparty to both the cash lender and the repo seller. Like in the case of the securities dealer, the CCP must be able to dispose freely of any received cash and securities under each side of the repo to perform its intermediary role. However, unlike securities dealers, CCPs only re-use collateral for settlement purposes, not to support other activities.

## III. The role of collateral re-use in securities lending markets

Under a securities lending transaction, one party (the "securities lender") makes a temporary transfer of a portfolio of securities to another (the "securities borrower") for a fee. The transfer is secured by collateral, mainly cash or a portfolio of other securities.[49] In the latter case, securities lending transactions are sometimes referred to as "collateral swaps".[50] In general, securities lending transactions are executed over-the counter and settled on a bilateral basis.[51]

The main standard agreements used to document securities lending transactions are the Master Securities Loan Agreement (MSLA), prepared by

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[48] See Baklanova, Copeland and McCaughrin (n 6) 11. For a complete list of the netting members of FICC, see Depository Trust & Clearing Corporation, 'FICC-GOV Member Directories' (*DTCC*) <http://www.dtcc.com/client-center/ficc-gov-directories> accessed 20 December 2016.

[49] Securities loans can also be secured by another form of financial commitment such as a letter of credit. See Baklanova, Copeland and McCaughrin (n 6) 25. However, this type of collateral is residual.

[50] See e.g. Matthew Dive and others, 'Developments in the Global Securities Lending Market' (2011) 2011 *Bank of England Quarterly Bulletin* 231 <http://www.bankofengland.co.uk/publications/Documents/quarterlybulletin/qb110303.pdf> accessed 20 December 2016.

[51] CCPs are attempting to move into the securities lending market, but by mid-2012, their penetration had been very limited. See FSB, 'Securities Lending and Repos: Market Overview and Financial Stability Issues' (n 31) 21.

SIFMA, and the Global Master Securities Lending Agreement (GMSLA), prepared by the International Securities Lending Association (ISLA). The former is subject to New York law and is mostly used in U.S. markets, whereas the latter is subject to English law and is the prevailing form in European markets.

The GMSLA takes the form of a TTCA. In the opening leg of the transaction, the securities lender will transfer the full title over the portfolio of loaned securities to the securities borrower, who will also transfer full title over any collateral, either cash or securities, to the securities lender.[52] As a result, both parties will have a right to dispose of the loaned securities and collateral as they deem fit.[53] Upon termination of the contract, the securities borrower will return a portfolio of the same or equivalent securities,[54] while the securities lender will return equivalent collateral plus any applicable fees.[55]

The MSLA takes the form of a security interest collateral arrangement ("SICA"). The securities lender will transfer 'all of the incidents of ownership' over the loaned securities to the borrower, 'including the right to transfer [such securities] to others.'[56] The securities borrower will grant the lender 'a continuing first priority security interest in, and a lien upon, the [c]ollateral[.]'[57] Unless the parties agree

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[52] See ISLA (ch 1, n 87) 1.1, 2.1, 2.3. Cash will be transferred into an account in the name of the repo buyer. The specific method to transfer securities will depend on how these are held. See n 25.

[53] Indeed, as of 28 February 2013, 99% of collateral received under securities lending transactions in Europe was eligible for re-use. See Keller and others (n 26) 16.

[54] See ISLA (ch 1, n 87) 1.1, 8. For a definition of "equivalent", see ibid 2.1. For an analysis of different methods to transfer securities, see n 25.

[55] The securities lender will normally receive a fee from the borrower when the collateral received is not cash. Typically, the agent lender and the securities lender will split the fees. See FSB, 'Securities Lending and Repos: Market Overview and Financial Stability Issues' (n 31) 19. If the securities lender receives cash collateral, it will normally pay the borrower interest on the cash collateral (the "rebate"). In the loaned securities are in high demand, the borrower may pay the lender a fee (the "negative rebate"). See ibid 20.

[56] Securities Industry and Financial Markets Association, 'MSLA' (n 11) 7.1.

[57] ibid 4.2. For a discussion of how security interests over securities may be granted under U.S. law, see Section II.C in Chapter 1.

otherwise, the securities lender will have a right to re-use cash collateral at its own risk.[58] Yet, it will only be allowed to re-use securities collateral if it is a "Broker-Dealer"[59] or if the borrower defaults.[60] Otherwise, the securities lender will have to segregate the collateral 'from all securities or other assets in its possession' during the term of any securities lending transaction.[61] Upon termination of the contract, the securities borrower, and the securities lender, if the latter has exercised a right to re-use securities collateral, will be liable to return equivalent securities.[62]

As we can see, the securities borrower will have a right to dispose of the loaned securities as it deems fit, subject only to the obligation to return equivalent assets upon termination of the contract. In this sense, the effects of a securities lending transaction resemble, essentially, those of a repo, and thus, of a secured loan. The same is true when the securities lender also has a right to re-use any received collateral. In this sense, both securities lending and repo transactions can be used to borrow cash or securities. The main differences between them are operational,[63] and the parties' preference for one type of asset or the other will normally drive the choice of legal agreement.[64]

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[58] See ibid.

[59] Any term used in capital letters shall be read in the terms described in the relevant standard agreement. For a definition of "Broker-Dealer" under the MSLA, see ibid 25.5.

[60] See ibid 4.2, 25.43.

[61] ibid 4.2. In any event, the parties can always agree to a different scope of such right to re-use securities collateral.

[62] No express provision in the MSLA grants the parties the right to return equivalent securities upon termination of the contract. Nevertheless, we can conclude that such a right is implicit in the right to dispose of the securities as the holder thinks fit, which is recognised expressly in the MSLA. See ibid 4.2, 7.1.

[63] Most notably, under a securities loan the parties may exchange their full titles over different portfolios of securities, whereas in a repo transaction, title over securities can only be exchanged for cash. Moreover, securities lending transactions may be either for a specific term or open-ended, i.e. with no fixed maturity date. Yet, it seems to be common market practice for securities lending transactions to be open-ended to allow the securities lender to call back the loaned securities on demand. See Baklanova, Copeland and McCaughrin (n 6) 34.

[64] See ibid 25.

Securities lenders tend to be institutional investors who manage unlevered or low-levered portfolios of securities and seek to enhance the return on their investment portfolios.[65] These investors include mutual funds, sovereign wealth funds, pension funds, endowments, and insurance companies.[66] Some central banks are also large securities lenders. For example, the U.S. Federal Reserve System (the "Fed"), one of the largest holders of U.S. Treasury securities, makes a large proportion of the Treasury securities it holds in its System Open Market Account available for lending to primary dealers.[67] The purpose of this securities lending programme is not to support the effective implementation of monetary policy, but rather to promote the trading and clearing of Treasury and agency securities by preventing settlement failures.[68]

Despite the large volume of securities available for lending in the E.U. (€6.4tn), recent data suggest that only 12.7% appeared to be used in actual securities lending transactions (€817.3bn).[69] U.S. securities lending markets seem to present a similar trend.[70] In principle, equity securities tend to dominate the spectrum of lendable assets, i.e. securities held within lending programmes. In practice, however,

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[65] In essence, these institutional investors have become collateral "mines" from which market participants can source securities collateral to meet their obligations. See Pozsar and Singh (n 21).

[66] See Baklanova, Copeland and McCaughrin (n 6) 29. Agent lenders may also act as principals when lending securities from their own account. They may even act as "undisclosed principals" when lending their customers' securities. See ibid 31.

[67] For a brief overview of this securities lending programme, see Fleming and Garbade (n 29) 207–210. Similarly, the ECB has recently launched a securities lending programme to make securities purchased under different Asset Purchase Programmes available to the markets in order to support bond and repo market liquidity. See ECB, 'Annual Report' (2015) 49.

[68] Indeed, the Federal Reserve does not accept cash collateral under this programme, which would drain reserves from the banking system. See Fleming and Garbade (n 29) 208. The ECB securities lending programme features similar requirements. See ECB, 'Lending of Holdings Purchased under the Public Sector Purchase Programme (PSPP)' <https://www.ecb.europa.eu/mopo/implement/omt/lending/html/index.en.html>. So do the BoE's securities lending programmes. See Bank of England, 'Explanatory Notes - Gilt Repo and Stock Lending Reported to the Bank' <http://www.bankofengland.co.uk/statistics/Pages/iadb/notesiadb/gilt_repo.aspx>.

[69] Data as of 28 February 2013. See Keller and others (n 26) 40.

[70] See Baklanova, Copeland and McCaughrin (n 6) 26–29.

debt securities, and, in particular, sovereign or government-sponsored debt securities, are in greater demand.[71] Nevertheless, most equity collateral is used in securities lending rather than repo.[72]

Securities lenders will normally engage an "agent lender" to facilitate these transactions.[73] Custodians are the main agent lenders.[74] They offer securities lending services to their clients in addition to custodial and administrative services they provide in relation to the securities they hold.[75] Nevertheless, other agent lenders such as asset managers and specialised consultants seem to have a growing presence in securities lending markets.[76]

Securities lenders typically provide their agent lenders with minimum eligibility requirements for non-cash collateral.[77] They also give their agent lenders specific instructions for the re-investment of cash collateral.[78] Because securities

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[71] As of the third quarter of 2011, the total market value of U.K. equities was twice as large as that of U.K. government bonds. A similar percentage of them were lendable (19% and 17% of total outstanding, respectively). Yet, 8% of total outstanding sovereign bonds were actually on loan, whereas only 1% of equities were on loan. See FSB, 'Securities Lending and Repos: Market Overview and Financial Stability Issues' (n 31) 31. The same data suggest a similar conclusion for the U.S. markets. A survey from the first quarter of 2015 confirms this intuition: while U.S. equities and U.S. Treasury and Agency bonds accounted for 31% of all assets on loan, there were almost five times more lendable equities. See Baklanova, Copeland and McCaughrin (n 6) 28.

[72] See n 19.

[73] Benefits of employing an agent lender include economies of scale, securities lending expertise, better access to borrowers, and indemnification against certain losses. See FSB, 'Securities Lending and Repos: Market Overview and Financial Stability Issues' (n 154) 21. Central Banks, however, tend to put their securities on loan through an auction process. For a brief description of how this auction process works, see Fleming and Garbade (n 29) 207–210.

[74] See Baklanova, Copeland and McCaughrin (n 6) 26.

[75] Examples of such administrative services include reporting and valuation. See ibid 31.

[76] Their growing incursion may respond to recent advances in technology and operational efficiency, which have made it possible to separate securities lending services from custody services. See ibid 26, 31.

[77] See FSB, 'Securities Lending and Repos: Market Overview and Financial Stability Issues' (n 156) 21; Baklanova, Copeland and McCaughrin (n 6) 35.

[78] See FSB, 'Securities Lending and Repos: Market Overview and Financial Stability Issues' (n 31) 20. As of 28 February 2013, in the E.U. securities lending market, around 95% of cash collateral received was reinvested. See Keller and others (n 26) 42. Cash collateral may be reinvested through separate accounts or through commingled accounts that pool several clients' assets. For example, as of

lenders enjoy a right to re-use the received collateral, they normally exercise it to cover the costs of custodial, administrative, and agent lending services, any applicable fees under the securities lending transaction, and if possible, to further enhance the return of their investment portfolios. Largely, cash collateral is reinvested in reverse repos.[79] A relatively small proportion is reinvested in debt, asset-backed securities, and cash and bank deposits.[80]

Traditionally, securities lenders in the U.S. have relied considerably more than their European counterparts on cash collateral than securities collateral.[81] This may be due to the existence of deep and broad money markets and repo markets, which represent relatively safe opportunities for securities lenders to reinvest cash collateral.[82] In the E.U., the data is inconclusive,[83] but in general terms securities collateral is more widely present than in U.S. markets, particularly for E.U. client

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28 February 2013, 41% of cash collateral received in the E.U. was placed into segregated accounts. That percentage was significantly higher in the case of non-E.U. clients: 68.9%. See ibid.

[79] In the E.U., 64% of cash collateral is reinvested in reverse repos. See Keller and others (n 26) 46. In the U.S., the percentage seems to be lower, yet predominant. See FSB, 'Securities Lending and Repos: Market Overview and Financial Stability Issues' (n 31) 32. Approximately 50% of collateral received under those reverse repos is U.S. Treasuries and Government Agencies, the rest being corporate collateral and equities. See ibid. E.U. markets present a similar trend. See Keller and others (n 26) 47–48.

[80] In the E.U., the percentage of cash collateral that is reinvested in these assets is 21.2% (credit institutions, 11.4%; governments, 7.2%; non-financial issuers, 2.6%), 5.1%, and 4.4%. See Keller and others (n 26) 46–47. In the U.S., external managed funds also seem to be an attractive option for cash collateral reinvestment. See FSB, 'Securities Lending and Repos: Market Overview and Financial Stability Issues' (n 31) 32. According to the FSB, in 2013, cash collateral re-investment practices amounted to approximately $USD1tn. See FSB, 'Strengthening Oversight and Regulation of Shadow Banking. Policy Framework for Addressing Shadow Banking Risks in Securities Lending and Repos' (ch 1, n 63) 4.

[81] As of Q3 2011, 74% of collateral in the U.S. was received in the form of cash (almost exclusively in USD). See FSB, 'Securities Lending and Repos: Market Overview and Financial Stability Issues' (n 31) 22.

[82] Another reason might be the interest rate environment. See Baklanova, Copeland and McCaughrin (n 6) 35.

[83] According to the FSB, as of Q3 2011, 59% of E.U. securities on loan were backed by non-cash collateral. See FSB, 'Securities Lending and Repos: Market Overview and Financial Stability Issues' (n 31) 22. According to the European Systemic Risk Board (ESRB), as of 28 February 2013, on average, only 35% of collateral received was in the form of securities. See Keller and others (n 26) 40.

assets.[84] Yet, when agent lenders' own assets or those of non-E.U. clients are on loan, cash collateral seems to be preferred.[85]

While agent lenders aggregate supply of lendable securities, securities dealers tend to aggregate demand.[86] They will typically do so as principal intermediaries, borrowing securities and re-using them under a subsequent securities lending transaction, typically as part of a prime brokerage service to their institutional clients.[87] In so doing, securities dealers provide credit transformation for securities lenders who may not wish to be exposed to the credit risk of certain securities borrowers.[88]

Securities dealers may also borrow securities on their own account. They use securities lending transactions to support their market making activities; typically, to settle purchase orders from customers.[89] They may also use these transactions for collateral management purposes,[90] to meet regulatory requirements,[91] or to cover short sales.[92] Lending of equity securities also plays an important role in proxy

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[84] In this, on average, 39.4% of collateral received was in the form of cash. See Keller and others (n 26) 41.

[85] In particular, 87.6% and 63.6% of collateral is posted in cash, respectively. See ibid.

[86] See Baklanova, Copeland and McCaughrin (n 6) 32. For a list of the main securities dealers in the U.S. and the E.U., see Singh, 'Velocity of Pledged Collateral: Analysis and Implications' (n 15) 5.

[87] Hedge funds, for example, are among the largest securities borrowers. See Baklanova, Copeland and McCaughrin (n 6) 33. They borrow securities to cover short sales.

[88] See ibid 32.

[89] See FSB, 'Securities Lending and Repos: Market Overview and Financial Stability Issues' (n 31) 21.

[90] For example, rather than using collateral assets of the highest quality to meet their collateral obligations under other transactions (e.g. OTC derivatives), they might seek to source collateral of a lower quality from other market participants to meet those obligations. Similarly, they might seek to swap their low quality securities for securities of a higher quality because the latter will be easier to finance in the repo market.

[91] Dealers may seek to temporarily "transform" the assets they hold in order to meet certain regulatory requirements such as capital and liquidity ratios, or to meet collateral requirements with CCPs in centrally-cleared derivatives. For an overview of collateral transformation services, see Tracy Alloway, 'The Shape Shifters' [2011] *The Markit Magazine* 16.

[92] See Baklanova, Copeland and McCaughrin (n 6) 33. 'A short sale is the sale of securities that the seller does not own and has to borrow to make delivery.' Fleming and Garbade (n 29) 205.

voting.[93] However, securities lenders often restrict the supply or call back loaned shares in advance of voting record dates.[94]

## IV. The collateralisation process: an illustrative transaction

The main terms of a repo agreement include: i) the sale price and the repurchase price;[95] ii) the "repo rate", which is calculated as the difference between the latter two prices;[96] iii) the type of securities collateral; iv) the haircut applicable to those securities collateral; and v) the tenor, or time to repayment.

Let us imagine that a hedge fund (A) is seeking to purchase a portfolio of securities on credit. A will contact its prime broker (B) to explore different funding opportunities. If the prime broker does not have the funds on its balance sheet, it will offer its institutional client to raise the funds in the repo market.

The prime broker, typically part of a larger financial institution such as a dealer bank, will contact the repo desk within the bank. The repo desk will search for an institutional investor who will be willing to lend its excess cash resources, e.g. an insurance company (C). B and C will enter into a GMRA and agree on the basic terms of the transaction, e.g.: the sale price (£100m), the repurchase price (£101m) and the tenor (7 days). They will engage a third party clearing bank (D) as a tri-party

[93] Hedge funds or other activist investors may borrow shares before a scheduled vote only to gather a larger voting position and return the shares immediately after the vote. This raises important corporate governance issues. See e.g. Henry TC Hu and Bernard S Black, 'The New Vote Buying: Empty Voting and Hidden (Morphable) Ownership' (2006) 79 Southern California Law Review 811.

[94] See Reena Aggarwal, Pedro ac Saffi and Jason Sturgess, 'The Role of Institutional Investors in Voting: Evidence from the Securities Lending Market' (2015) 70 The Journal of Finance 2309.

[95] The sale price is akin to the principal amount on a cash loan.

[96] Typically, the repurchase price will be higher than the sale price. The difference between them, i.e. the repo rate, is tantamount to the interest rate paid to the lender under a cash loan.

agent to settle the transaction for them and to provide back-office support.[97] As part of that support, D will specify the type of assets that B can post to collateralise the repo transaction, as well as the haircuts applicable to each type of asset.[98]

Generally, B will try to post collateral assets at the lowest cost possible. For that, it can either use its own assets or those of its institutional client, A. Typically, as part of their prime brokerage agreement, the institutional client will grant the dealer bank a right to re-use the former's assets.[99] Such a right to re-use will also allow the dealer bank (B) to meet any calls for additional margin from its counterparties such as C by disposing of A' assets. It is reasonable to assume that, when possible, the dealer bank will prefer to post its client's assets than to post its own.[100]

After looking at the client's assets it holds, B decides to post a portfolio of different U.K. Treasury bonds, or "Gilts", by exercising its right to re-use under the prime brokerage agreement. According to the collateral eligibility requirements, the applicable haircut will be 5%.[101] Haircuts represent the amount of over-collateralisation of the lender's exposure. If the borrower were to default on its obligation to repurchase the securities previously transferred as collateral, the haircut would guarantee the lender that as long as the market value of that collateral does not drop more than 5% in relation to its previous valuation, the borrower's obligation will be fully collateralised.

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[97] B and C will each enter into a clearing agreement with D. In addition, the three parties will enter into a custodial undertaking agreement (CUA) to establish D as the tri-party agent for the repo transaction. Typically, the tri-party agent will earn fee for the provision of these services. However, for the sake of simplicity, this simple transaction does not specify any.

[98] These collateral eligibility criteria will be documented in the CUA.

[99] See n 45.

[100] See e.g. Singh, 'Velocity of Pledged Collateral: Analysis and Implications' (n 15) 12.

[101] In the tri-party repo market, haircuts are not negotiated on a trade-by-trade basis. They may depend on a number of factors, including the historical price volatility for the asset type, the loan term, and the identity of the dealer. See Copeland and others (n 17) 5. The haircut in our example is in line with current market price. See e.g. ICMA, 'European Repo Market Survey (Dec. 2015)' (n 19) 16.

B will then transfer a portfolio of Gilts with a market value of £105m to its securities account at D. D, in turn, will transfer that portfolio to C's securities account, and, simultaneously, D will transfer £100m in cash from C's cash account to B's cash account.

Once the tri-party repo transaction is complete, B will proceed to re-transfer the cash received to its institutional client A.[102] This will normally be done in a bilateral repo; in particular, a reverse repo where the dealer bank makes a secured loan to its institutional client. A and B will have entered into a GMRA under their prime brokerage agreement, specifying the terms of their repo transaction. They will agree that the re-used Gilts posted as collateral under the tri-party repo transaction will also serve as collateral under this bilateral repo transaction.[103] Normally, the sale price under this transaction will coincide with the one under the tri-party repo transaction used to raise the funds; in our example: £100m. The dealer bank may negotiate a higher repurchase price in order to compensate for its intermediation services and the risks associated with it. For the sake of simplicity, however, I will assume that the repurchase price is the same, i.e. £101m. I will also assume that the applicable haircuts will be identical.[104]

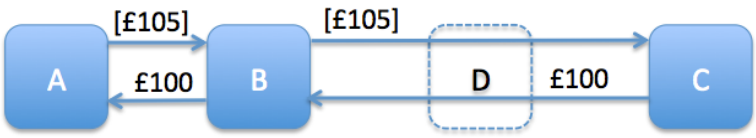
The Diagram below shows the flows of assets when the contract is executed (i.e. $t_0$).

[102] For that, the dealer bank will normally instruct the clearing bank to make a cash transfer to a third party account, even if that account is not with the clearing bank, e.g. the institutional client's account with the dealer bank.

[103] Another option would have been to use the securities that A would purchase using the cash raised in this bilateral repo to collateralise the repo itself. This practice is called "margin lending".

[104] In practice, the haircut that the dealer bank applies to the collateral posted by its institutional client may be higher than the one applied under a tri-party repo transaction to reflect the higher credit risk of the counter party. See n 101.

Diagram 2.1. Illustrative repo transaction on $t_0$[105]




Let us further imagine that C and D have also entered into a custody agreement and that D, as custodian bank, also offers securities lending services to its account holders. After the tri-party repo transaction has been settled, D can contact C to enquire about the latter's willingness to make the securities held in the account available for loan. If C agrees, D will search for potential borrowers of those securities. Let us now imagine that D has found another dealer bank (E) who holds a custody account with D and is interested in borrowing the gilts portfolio that C holds in its account as collateral from the tri-party repo transaction.

In this case, C and E will enter into a GMSLA where they will specify a series of elements, e.g.: i) the securities on loan, ii) the tenor of the loan, iii) the type of collateral, iv) the haircut applicable to that collateral, and v) the lending fee.[106] For example, the parties will specify that the portfolio of Gilt securities will be loaned against a portfolio of equity and corporate debt securities with a market value of £120m, which means a haircut of approximately 14.5%. The tenor will be open, thus giving the securities lender the opportunity to recall the securities at any time.[107] Moreover, C will typically receive a lending fee in compensation for the loaned

[105] The clearing bank (D) is depicted with a dotted line because it does not stand as a principal in the transaction. In other words: it does not stand as a repo buyer to B nor as a repo seller from C, like a CCP would do. D only settles the repo transaction on its books by moving cash and securities between different accounts.

[106] When a custodian bank intervenes as agent lender it will normally negotiate these terms on behalf of the securities lender. See FSB, 'Securities Lending and Repos: Market Overview and Financial Stability Issues' (n 31) 19.

[107] This is common market practice. See ibid 20.

securities.[108] For the sake of simplicity, I will assume the lending fee to be zero in this case.

E will transfer the securities collateral into its account with D, assuming they were not already there. D will then transfer the Gilts portfolio from C's account to E's account and, simultaneously, transfer the securities collateral from E's account into C's account.

In theory, nothing would prevent C from re-using those securities collateral under a new securities lending transaction if its agent lender D were to find a potential borrower. Similarly, dealer bank E will now be able to dispose of the borrowed securities as it thinks fit, e.g. to cover a short sale, to settle a transaction as part of its market making activities, to meet its collateral obligation under another transaction, or for regulatory compliance purposes. Additionally, it could transfer those borrowed securities to one of its institutional clients, e.g. hedge fund F, to permit the latter to cover a short sale position. Like in the case of the bilateral repo transaction described above, this type of securities lending transaction would typically fall under the umbrella of a prime brokerage relationship. In this situation, it would be common for the dealer bank to source the portfolio of equity and corporate debt securities posted as collateral from the client's assets it holds by exercising a right to re-use.[109]

E and F will enter into a GMSLA to document their securities lending transaction. Let us assume that E transfers the same Gilts portfolio received from C under the first transaction, that the same securities collateral used in the first transaction serves as collateral under this new transaction, receiving the same

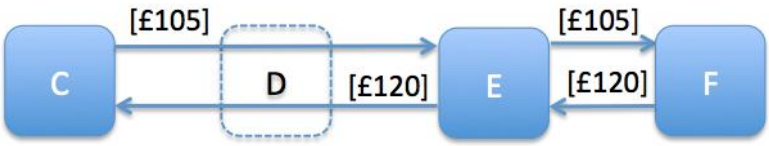
[108] See n 55.

[109] Such right to re-use is a common feature of prime brokerage agreements. See n 45.

haircut,[110] and that this second transaction also has an open tenor. After having received the Gilts portfolio from C in its securities account, dealer bank E transfers the portfolio to its client's account. The client account may be an omnibus account, where the dealer bank pools all the securities of the same type from its different clients, or an individual account where securities are segregated for each client. Similarly, E will have transferred the securities collateral from F's account to C's account. It is important to note that these securities will be transferred between different accounts held at the same custodian bank; in our case, D.

The following Diagram illustrates the flow of assets when the securities lending transaction is executed; in our example, $t_1$.

Diagram 2.2. Illustrative securities lending on $t_1$




One additional element that the parties to a repo or a securities lending contract would typically include is a valuation date.[111] On each valuation date, the parties will calculate the market value of their positions under the contract and the market value of any posted collateral.[112] These valuations will allow the parties to make sure that the collateralisation of their exposures is not affected by changes in the value of the collateral. Thus, if the market value of any posted collateral drops, the contracts will normally grant the collateral taker a right to request additional

[110] The haircut applied to securities collateral received under this second transaction may be higher than the one applied in the first transaction for similar reasons to those outlined in the case of repos.

[111] In theory, valuation dates may be 'at any time'. See e.g. ICMA and SIFMA (ch 1, n 87) 4(a).

[112] In the securities lending market, this will usually be done by the agent lender. See FSB, 'Securities Lending and Repos: Market Overview and Financial Stability Issues' (n 31) 19.

collateral from the collateral provider to make up for that drop.[113] Similarly, if the market value of the collateral were to rise, the contracts typically grant the collateral provider the right to request the collateral taker to return some of the collateral received in order to reduce the over-collateralisation resulting from the rise in the market value of the securities collateral. The parties may resort to different methods to calculate the market value of the collateral.[114]

Let us imagine that all the contracts in this example provide for a valuation date on the third day, i.e. $t_3$, and that the value of the Gilts portfolio then has dropped from £105m to £103m. Let us further assume that the market value of the equity and corporate securities collateral posted under the two securities lending transactions remains at £120m. As a result of this change in the market value of the Gilts portfolio, the haircut levels are no longer met. In the repo transactions, the haircut is now 3%.[115] In the securities lending transactions, the haircut is now approximately 16.5%.[116] Consequently, the parties having received that Gilts portfolio under the different transactions will have a right to call for additional collateral from their counterparties;[117] in particular, for securities collateral with a market value of £2m.[118, 119] This would restore haircuts to their original levels as agreed in the relevant contracts.

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[113] See e.g. ICMA and SIFMA (ch 1, n 87) 4(a); ISLA (ch 1, n 87) 5.4–5.8; Securities Industry and Financial Markets Association, 'MRA' (n 25) 4; Securities Industry and Financial Markets Association, 'MSLA' (n 11) 9.

[114] See e.g. the definition of "Market Value" in ICMA and SIFMA (ch 1, n 87) 2(ee); ISLA (ch 1, n 87) 2.1.

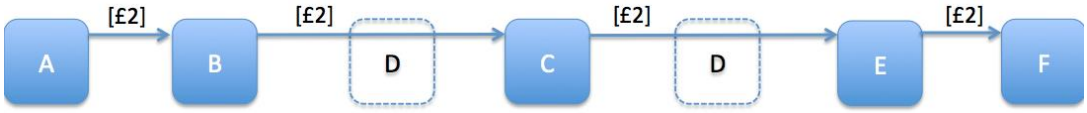
[115] [(103-100)/100]*100 = 3%.

[116] [(120-103)/103]*100 = 16.5049%.

[117] In repo transactions, B will have the right to request that additional collateral from A, and C from B. In securities lending transactions, however, the parties will typically agree that if the value of the loaned securities drops, the securities borrower will have a right to request the return of posted collateral rather than to request that more securities are loaned. See e.g. ISLA (ch 1, n 87) 5.4(b).

[118] If the market value of the Gilts portfolio were to rise, the collateral calls would flow in the opposite direction.

Diagram 2.3. Collateral calls on $t_3$




If the first repo contract were to terminate on its maturity date (i.e., $t_7$), A would be liable to repurchase the Gilts portfolio at the pre-agreed price (i.e. £101m), and B would be liable to return a portfolio of the same or equivalent Gilts.[120] Because B had re-used the Gilts portfolio under a repo transaction with C, B could either recall the portfolio under the tri-party repo with C, or it could purchase a portfolio of equivalent securities from the market. In the former case, C would face a similar situation: because it had re-used the Gilts portfolio by lending them to E, C could recall the Gilts portfolio by terminating the securities lending transaction with E,[121] or it could purchase a portfolio of equivalent Gilts in the market. In the former case, E would face a similar choice to those of B and C: recalling the securities from her counterparty, F, or purchasing a portfolio of equivalent Gilts in the market. The following graphic depicts the flow of cash and collateral if all transactions along the chain were to terminate on $t_7$.

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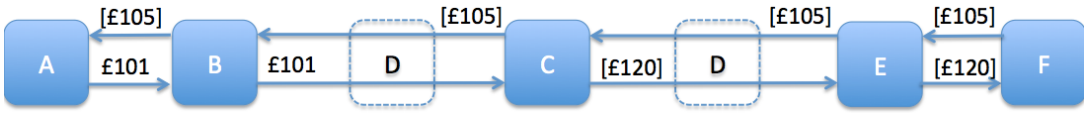
[119] Technically, E and F are securities borrowers. From their perspective, the Gilts portfolio represents "loaned securities" rather than "collateral"; i.e. they provide collateral in the form of a different securities portfolio to guarantee their obligation to return equivalent securities to those originally borrowed. As an alternative to requesting additional collateral from their respective securities lenders, they could also request that the latter return part of the securities collateral until the haircut level that had been agreed originally is restored. See e.g. ISLA (ch 1, n 87) 5.4(b), 5.5(b). Similarly, under a repo transaction, rather than calling for additional collateral, the parties may agree to "reprice", adjust the transaction, or a combination of the two. See e.g. ICMA and SIFMA (ch 1, n 87) 4(j)–(l).

[120] I will assume that the market value of all securities collateral has remained the same as it was on $t_3$. In other words: there have no additional collateral calls.

[121] Their securities lending transaction had an open maturity, which allows any of the parties to terminate the contract at will by returning the securities received.

Diagram 2.4. Termination of contracts on maturity




These Diagrams illustrate how the re-use of collateral can form collateral chains that link several market participants. The basic sample transactions introduced in this Section describe how cash and collateral flow between different market participants along a collateral chain, and the relevant role that collateral re-use plays in modern-day securities financing markets.

# V. Conclusion

The main standard contracts used to document SFTs generally provide the collateral taker with a right to re-use. Today, the exercise of that right is a common market practice, particularly for those participants who play an intermediary role. For example, in repo markets, securities dealers rely on their right to re-use their institutional client's assets to provide cash intermediation, normally under prime brokerage services. Nevertheless, they may also re-use their clients' assets for many other purposes, including financing their own positions. Moreover, some repo buyers will exercise their right to re-use securities collateral received under a repo to generate additional returns that will allow them to cover the costs of holding those assets in custody, or simply to enhance the return of their portfolios. One possibility of re-using collateral is to make the securities collateral available on loan through a custodian bank.

In the securities lending market, the main standard contracts also provide the parties with a right to re-use collateral. Securities dealers, for example, will normally

re-use their clients' assets to borrow securities on their behalf, thereby allowing for the intermediation of securities between different parts of the system. Similarly, securities lenders will re-invest the cash collateral received, normally in reverse repos, to generate additional returns. They may also re-use any securities collateral received under a securities swap.

By permitting collateral assets to circulate between different market participants, collateral re-use supports the provision of core functions such as the allocation of cash and securities resources to different parts of the financial system. Although collateral re-use plays a central role in modern-day securities financing markets, its popularity is rather recent. In Chapter 4, I will examine some of the regulatory reforms that helped promote the re-use of collateral in securities financing markets. Before I do that, however, let me describe how collateral re-use plays a central role in another important financial market: OTC derivatives.

# Chapter 3. Collateral Re-use in OTC Derivatives Markets

## I. Introduction

Derivatives are instruments the value of which is derived from the value of an underlying reference. The underlying reference could be a financial variable, such as an interest rate or an index, or an asset, such as a physical commodity, a currency, a company's shares or 'virtually any other tradable instrument upon which parties can agree.'[1] Derivative contracts enable market participants to gain an exposure to these underlying references. This exposure may allow market participants to hedge against certain risks, e.g. changes in the price of an asset or an interest rate. Other participants may be driven by the sheer intention to speculate with the probability of a change in the price of that underlying asset.

We can classify derivatives according to two different aspects: how they are executed, and how they are cleared and settled.[2] Derivatives can be executed on an

[1] ISDA, 'Product Descriptions and Frequently Asked Questions' <http://www.isda.org/educat/faqs.html>.

[2] The settlement process refers to the transfer of cash or assets necessary for counterparties to perform (and discharge) their obligations. See Robert R Bliss and Robert S Steigerwald, 'Derivatives Clearing and Settlement: A Comparison of Central Counterparties and Alternative Structures' (2006) 30 Economic Perspectives 22, 22. For example, a derivative contract can be "cash-settled", if a party has a payment obligation that is determined in reference to the underlying asset, or "physically-settled", if she has an obligation to deliver that underlying asset. The clearing process involves a series of operations that aim at avoiding the risk of a counterparty default after trading and before settlement, e.g. determining payment obligations and collateral requirements, or netting different obligations. See ibid 23–24. Clearing and settlement operations may vary between different countries and different markets. See ibid.

exchange, a centralized facility that matches bids and offers of many buyers and sellers,[3] or they can be executed privately between two parties (i.e. over-the-counter or "OTC").[4] Moreover, derivatives can be cleared through a clearinghouse, which will typically stand as a central counterparty ("CCP") and settle the transaction on its own books, or they can be cleared and settled directly on the books of each of the parties to the transaction (i.e. bilaterally cleared). Exchange-traded derivatives are always centrally cleared.[5] OTC derivatives, however, may be centrally or bilaterally cleared.

Table 3.1. Classification of derivative contracts

| Trading \ Clearing | Bilateral | Central |
|---|---|---|
| Exchange | | |
| Over-the-counter ("OTC") | | |

There are two basic types of derivatives products: options and forwards. A forward is an agreement to buy or sell an asset at a certain time for a certain price. They are traded over-the-counter. Forwards that are traded on an exchange are called futures. An option gives its holder the right, but not the obligation, to buy or sell an asset at a certain time for a certain price. They can trade on exchanges or over-the-

[3] See Darrell Duffie, Ada Li and Theo Lubke, 'Policy Perspectives on OTC Derivatives Market Infrastructure' (2010) Federal Reserve Bank of New York Staff Report no. 424 1.

[4] According to the Bank for International Settlements (BIS), at the end of 2014, the outstanding gross notional value of exchange-traded derivatives was approximately $USD65tn, whereas the same value for OTC derivatives was approximately $USD630tn. See Arshadur Rahman, 'Over-the-Counter (OTC) Derivatives, Central Clearing and Financial Stability' [2015] *Bank of England Quarterly Bulletin* 283, 284. 'The notional value is a measure of activity but not necessarily of economic exposure or of risk.' ibid.

[5] In fact, most CCPs are owned or managed by exchange platforms. See Dietrich Domanski, Leonardo Gambacorta and Cristina Picillo, 'Central Clearing: Trends and Current Issues' [2015] BIS Quarterly Review 59, 63.

counter. These basic derivatives can be combined to form more complex products. For example, swaps are a sequential combination of forwards.[6]

According to statistics from the Bank for International Settlements (BIS), the gross market value[7] of all outstanding OTC derivatives at the end of June 2016 was $USD20.7tn.[8] Interest rate contracts are the biggest category within OTC derivatives, with a gross market value of $USD15.1tn on the same date.[9] Foreign exchange contracts ($USD3.06tn), equity-linked contracts ($USD515bn) and credit default swaps ($USD342bn) are the second, third and fourth biggest categories, respectively.[10] The proportion of OTC derivatives that are being cleared through a CCP has been growing steadily since 2010, but the proportion of bilaterally cleared derivatives still remains considerably high.[11]

The complexity and limited transparency in OTC derivatives markets may have contributed to the 2007-08 financial crisis by reinforcing excessive risk-taking practices in these markets.[12] In September 2009, in an attempt to 'tackle the root causes of the crisis and transform the system for global financial regulation',[13]

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[6] For a detailed analysis of these and other derivative products, see John Hull, *Options, Futures, and Other Derivatives* (Ninth edition, Pearson 2015).

[7] Gross market value measures the replacement cost of all outstanding contracts had they been settled at the time of the relevant survey.

[8] See Bank for International Settlements, 'Semiannual OTC Derivatives Statistics' (*BIS statistics*, 11 December 2016) <http://www.bis.org/statistics/derstats.htm> accessed 21 December 2016.

[9] See ibid.

[10] See ibid.

[11] The FSB has reported that the average clearing volumes of interest rate swaps have quadrupled between 2010 and 2015. It also reports that levels for newly transacted OTC derivatives are considerably higher. See FSB, 'OTC Derivatives Market Reforms: Tenth Progress Report on Implementation' (2015) 9. Moreover, according to the BIS, 'the share of outstanding [credit default swaps] contracts cleared through CCPs has risen from less than 10% at mid-2010 (when data for CCPs were first reported separately) to 26% at end-2013 and 34% at end-December 2015'. BIS, 'OTC Derivatives Statistics at End-December 2015' (2016) Statistical Release 5.

[12] See Duffie, Li and Lubke (n 3) 1.

[13] G20, 'G20 Leaders Statement: The Pittsburgh Summit' para 11 <http://www.g20.utoronto.ca/2009/2009communique0925.html>.

leaders of the Group of Twenty ("G-20")[14] committed to improving OTC derivatives markets by requiring that all standardised swaps be traded on exchanges or electronic trading platforms,[15] cleared through CCPs, and reported to trade repositories.[16] In addition, the G-20 leaders agreed on applying higher capital requirements for bilaterally cleared derivatives.[17]

Since then, international organisations such as the BIS, the FSB, and the International Organisation of Securities Commissions (IOSCO) have developed different standards and principles to guide financial regulators across the G-20 countries in the implementation of post-crisis regulatory reforms.[18] In the E.U., the European Markets Infrastructure Regulation (EMIR) concentrated most of these reforms.[19] In the U.S., the main regulatory reforms were introduced in the Dodd–Frank Wall Street Reform and Consumer Protection Act ("Dodd-Frank Act"),[20] and later developed by the Commodity Futures and Trading Commission (CFTC) and the Securities Exchange Commission (SEC).

The regulation of financial collateral in SFTs and OTC derivatives markets as part of the G-20 agenda is still unfinished. For example, regulators in the E.U. and

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[14] The G-20 is a forum for the twenty largest advanced and emerging economies. The U.K., the U.S., and the E.U. are among its members. For a full list of members, see G20, 'About G20' 20 <http://www.g20.org/English/aboutg20/AboutG20/201511/t20151127_1609.html>.

[15] Exchanges and electronic trading platforms have the potential to improve transparency in OTC derivatives markets. They allow participants to post quotes on a screen that is visible to other participants in the exchange or platform. However, unlike exchanges, 'many [electronic trading platforms] do not automatically match bids and offers in order to execute trades.' Duffie, Li and Lubke (n 3) 18.

[16] See G20 (n 13) 13.

[17] See ibid.

[18] See e.g. Committee on Payment and Settlement Systems and Technical Committee of the International Organization of Securities Commissions, 'Principles for Financial Market Infrastructures' (2012); BCBS and IOSCO (n 72); Committee on Payments and Markets Infrastructures and others, '2015 CCP Workplan' <http://www.bis.org/cpmi/publ/d134b.pdf> accessed 19 June 2016.

[19] See Regulation (EU) No 648/2012 of the European Parliament and of the Council of 4 July 2012 on OTC derivatives, central counterparties and trade repositories ("EMIR") [2012] OJ L201/1.

[20] (Pub.L. 111–203, H.R. 4173), effective on 21 July 2010.

the U.S. have only recently adopted new margin requirements for bilaterally cleared OTC derivatives that also affect collateral re-use. Nevertheless, in this Chapter, I will provide a description of the use and re-use of collateral in OTC derivatives markets ignoring these recent regulatory developments. My purpose is twofold. First, the implementation of these new regulatory requirements is far from complete.[21] Any description based on on-going reforms faces the risk of being inaccurate. I will examine these proposed reforms in Chapter 7, however, as part of a broader analysis of policy implications. And second, by postponing the analysis of these proposed reforms until the end of the dissertation will allow me to evaluate the extent to which these recent reforms address the systemic risks that I explore in Chapters 5 and 6.

This Chapter is structured as follows. In Section II, I examine the collateralisation practices in bilaterally cleared derivatives markets. I describe how collateral re-use is a widespread practice in today's markets that enables collateral takers to dispose of collateral received under these transactions to meet obligations with third parties. In Section III, I analyse the collateralisation practices in centrally cleared derivatives. I describe how the ability of clearinghouses to dispose of received collateral under certain circumstances will be essential to their function as CCPs. In Section IV, I present a sample swap transaction to illustrate in greater detail how the process of collateralisation works and how collateral assets can be re-used. Section V concludes.

[21] These new margin requirements will enter into force on a progressive basis. In the E.U., for example, full implementation is not expected until September 2020. See Commission Delegated Regulation (EU) 2016/2251 of 4 October 2016 [2016] OJ L340/9, art 36(1)(e).

## II. The role of collateral re-use in bilaterally cleared derivatives

In OTC markets, transactions are negotiated directly between two parties, without resorting to exchange trading platforms that centralise sale and purchase orders from different market participants. In this context, finding a counterparty to every trade can be very difficult. Intermediation between different buyers and sellers becomes crucial for trading.

In OTC derivatives markets, such intermediary role is undertaken by a handful of dealer banks.[22] 'These dealers quote bid and asking prices to other traders on the basis that they are willing to take either side of the contemplated trade.'[23] If they enter into a transaction, they will then normally look to hedge their resulting exposure 'by seeking out and entering into one or more offsetting swaps with other traders or, in many cases, other dealers'.[24] When permitted, 'dealers may also enter into proprietary trades on the basis of their expectations regarding future price movements'.[25]

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[22] For example, in 2011, 'the five largest derivative dealers—JPMorgan Chase, Bank of America, Goldman Sachs, Morgan Stanley, and Citigroup—account[ed] for about 95% of total notional credit derivatives positions held by all U.S. banks.' Darrell Duffie and Haoxiang Zhu, 'Does a Central Clearing Counterparty Reduce Counterparty Risk?' (2011) 1 Review of Asset Pricing Studies 74, 85. More recently, large asset managers such as BlackRock have started to act as market makers in OTC derivatives. See Dan McCrum and Michael Mackenzie, 'BlackRock Looks to Take on Wall Street' *Financial Times* (12 April 2012) <https://www.ft.com/content/4112b7dc-84b0-11e1-a3c5-00144feab49a> accessed 22 December 2016. Market participants have strong incentives to deal only with one counterparty rather than many. Due to netting arrangements, established relationships tend to reduce the effective cost of unwinding transactions when done through offsetting positions. Moreover, established relationships also produce reduced search costs and a reduction in information asymmetries. See Robert R Bliss and George G Kaufman, 'Derivatives and Systemic Risk: Netting, Collateral, and Closeout' (2006) 2 Journal of Financial Stability 55, 61.

[23] Dan Awrey, 'The Mechanisms of Derivatives Market Efficiency' (2016) 91 New York University Law Review 1104, 1134. 'By allowing counterparties to trade at a dealer's quoted bid and ask prices, the dealer provides liquidity to the market, with an intent to profit on average over many trades, by buying low and selling high.' Duffie, Li and Lubke (n 3) 10.

[24] Awrey (n 23) 1134. There specialised brokers who facilitate trades between derivatives dealers. The largest interdealer brokers are NEX Group, Tullet Prebon, Tradition, BCG Partners, and GFI Group. For a more detailed analysis of the role of interdealer brokers in OTC derivatives, see ibid 1146–48.

[25] Awrey (n 23) 1134.

Once the trade is agreed upon, the derivatives dealer and its counterparty will need to clear the transaction.[26] If the two counterparties clear the transaction on their own books, then the transaction is said to be "bilaterally cleared". If the transaction is cleared on the books of a CCP, then the transaction is said to be "centrally cleared". In this section I will explore bilaterally cleared derivatives. I will focus on centrally cleared OTC derivatives in the next section.

In bilaterally cleared derivatives, the parties will normally document their transactions using standard documentation such as that prepared by the International Swaps and Derivatives Association ("ISDA"). [27] Every transaction will be documented with an individual confirmation, and all confirmations will be deemed to be part of the same master agreement; e.g., the ISDA 2002 Master Agreement ("ISDA MA").[28] This is sometimes referred to as the "single agreement principle".

During the life of a swap, variations in the value of the underlying reference will determine the extent of each of the parties' obligations. For example, under an interest rate swap, one party (A) will agree to transfer a variable interest rate (e.g. LIBOR + 3%) over a notional amount (e.g. £100m) every six months, while the other (B) will agree to transfer a fixed interest rate (e.g. 4%) over the same notional amount and with the same frequency. The fluctuation of LIBOR will determine the amount of each of the parties' payment obligations. For example, if on the Valuation Date, LIBOR is 1.5%, A will have an obligation to pay B £4.5m, and B will have an

[26] The clearing process involves a series of operations that aim at avoiding the risk of a counterparty default after trading and before settlement. See n 2.

[27] The ISDA is the main derivatives industry association. As of December 2016, it represents more than 850 institutions from 66 countries. See 'ISDA's Website' <www.isda.org>.

[28] See ISDA, '2002 Master Agreement' s 1(c). Today, market participants predominantly use the ISDA MA to document bilaterally cleared derivatives. See Paul C Harding, *Mastering the ISDA Master Agreements (1992 and 2002): A Practical Guide for Negotiation* (Third edition, Financial Times Prentice Hall 2010) 24. The Preamble of the ISDA MA defines Confirmations as 'evidence […] exchanged between the parties or otherwise effective for the purpose of confirming or evidencing [the relevant derivative] Transactions'.

obligation to pay A £4m. Typically, the ISDA MA allows the parties to reduce their exposure to each other through the application of different bilateral netting mechanisms so that only the party with the largest obligation will be liable to pay, and only for the net amount..[29] In our example, on the valuation date, only A will be liable to pay B, and only for the net amount of £0.5m. A will be said to be "out-of-the-money" and B to be "in-the-money".

If A and B had concluded several derivatives transactions under the ISDA MA that were due on the same date, the netting mechanism could apply over all of them on the basis of the "single agreement principle". Similarly, in the event of default, this principle will permit the non-defaulting party to terminate all outstanding transactions and net all payment obligations thereunder so that only one net amount will be payable by whatever counterparty had the largest aggregate payment obligation.[30] This latter mechanism is often referred to as "close-out netting".

In order to mitigate their counterparty credit risk, the parties will normally support their master agreements with a financial collateral arrangement.[31] In the U.K., market participants mainly use the ISDA Credit Support Annex subject to English law ("ENG CSA").[32] In the U.S., market participants rely on ISDA's Credit

[29] See ISDA, 'ISDA MA' (n 28) 2(c).

[30] See ibid 6(a). The ISDA MA specifies a series of Events of Default, as well as other Termination Events, that may lead to the Early Termination of the Contract. For a detailed list of these events, see ibid 5.

[31] If enforceable, a collateral agreement normally reduces losses in the event of a counterparty's default. In the absence of collateral, the parties' exposure equals the net market value of the derivatives transactions. If collateralised, however, such exposure will be reduced to the difference between the net market value of the transactions and the market value of the collateral held (if positive) or zero (if such value equals or exceeds the value of the transactions). See BIS, 'OTC Derivatives: Settlement Procedures and Counterparty Risk Management' (1998) 31.

[32] See ISDA, 'ISDA Margin Survey 2015' (Introduction, n 4) 11. ISDA has also prepared a SICA that is governed by English law: the Credit Support Deed. The Deed, however, is hardly ever used. See ibid.

Support Annex subject to New York State law ("NY CSA").[33] Under the ENG CSA, the collateral provider will transfer the full title over the collateral assets,[34] whereas under the NY CSA the collateral provider will grant a 'first priority continuing security interest' in the assets.[35] Both documents are deemed to be parts of the Schedule of the ISDA MA.[36]

In OTC derivatives, the collateral taker protects herself against her counterparty's credit risk by taking collateral in two forms: variation margin and initial margin.[37] Variation margin is intended to cover a party's current exposure to changes in the market value of the underlying obligations.[38] It is normally posted on a bilateral basis, i.e. either party may be required to provide, or eligible to receive, variation margin.[39] Moreover, participants will normally use cash collateral to meet variation margin requirements.[40] Nowadays, the frequency with which posted

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[33] See ISDA, 'ISDA Margin Survey 2015' (Introduction, n 4) 11.

[34] See ISDA, 'ENG CSA' (ch 1, n 87) 5(a), 5(b).

[35] ISDA, 'NY CSA' (ch 1, n 57) 2.

[36] The relationship of each of these documents to the ISDA MA is slightly similar, however. For a detailed discussion, see Paul C Harding, *Mastering the ISDA Collateral Documents : A Practical Guide for Negotiators* (2nd ed, Pearson 2012) 105, 259.

[37] In the context of bilaterally cleared derivatives, initial margin is often called "Independent Amount". See ISDA, 'Market Review of OTC Derivative Bilateral Collateralization Practices (2.0)' (2010) 12. Although they are often used interchangeably, the terms "initial margin" and "independent amount" exist in different contexts and are calibrated differently: '[Independent Amount] provides protection against default loss in conjunction with *bilateral* Variation Margin and regulatory capital; whereas [Initial Margin] provides protection in conjunction with *clearinghouse* Variation Margin and the rest of the clearinghouse "waterfall".' ISDA, 'ISDA Margin Survey 2013' (n 104) 10 (emphasis added). Despite this difference, both categories aim at the same goal. For that reason, and for the sake of clarity, I will use the more general term "initial margin" throughout the thesis.

[38] See BCBS and IOSCO (ch 1, n 63) 12.

[39] In particular, ISDA has reported that at the end of 2012 88% of collateral agreements were of a bilateral nature. See ISDA, 'ISDA Margin Survey 2013' (n 104) 12. Mr. Scott O'Malia, chief executive of ISDA, confirmed this more recently. See Philip Stafford and Jim Brunsden, 'EU Sets November Date for Derivatives Rules' *Financial Times* (8 November 2016) <https://www.ft.com/content/5edad57e-a5a8-11e6-8b69-02899e8bd9d1> accessed 19 November 2016.

[40] At the end of 2014, 77.2% and 75.3% of variation margin was received and delivered, respectively, in the form of cash. See ISDA, 'ISDA Margin Survey 2015' (Introduction, n 4) 13. One of the main reasons to rely on cash collateral as variation margin is that it will allow the counterparties to '[fund] the future cashflows with minimized currency and basis risk'. See ISDA, 'ISDA Margin Survey 2013'

collateral is valued varies substantially depending on the counterparty. Transactions among dealer banks and between the latter and hedge funds normally include daily valuation.[41] Transactions between dealer banks and non-dealer banks or between the former and sovereign, supra-national or local authorities are normally valued less frequently.[42] Transactions between dealer banks and corporations are often subject to infrequent posting, e.g. weekly or monthly.[43]

Initial margin is intended to cover any losses that variation margin could potentially leave uncovered,[44] e.g. potential changes in the value of the defaulting party's positions during the time between the receipt of the last variation margin and the time when the positions are completely closed out.[45] That period is sometimes known as the "margin period of risk".[46] Initial margin can be calculated according to

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(n 104) 8. This has been one of ISDA's main motivations to develop new standard Credit Support Annexes, which only allow variation margin to be posted in cash. See ISDA, 'Standard Credit Support Annex (Title Transfer - English Law)' (2014); ISDA, 'Standard Credit Support Annex (Security Interest - New York Law)' (2014). I hall refer to these standard agreements as "ENG SCSA" and "NY SCSA", respectively. These standard Credit Support Annexes seek to homogenise valuation practices in order to 'align the mechanics and economics of collateralization between' bilaterally and centrally cleared OTC derivatives. A slightly different version of these two standard CSAs had been published in 2013 as well. All of these new standard documents also aimed at 'reducing current barriers to novation and valuation disputes.' See the description of these documents in ISDA, 'ISDA Credit Support Documentation' (*ISDA Bookstore*) <http://www.isda.org/publications/isdacredit-users.aspx> accessed 18 December 2016. Nevertheless, the latest data on market practices that is publicly available indicates that the NY CSA and ENG CSA remain the most popular standard documents. See ISDA, 'ISDA Margin Survey 2015' (Introduction, n 4) 11.

[41] See ISDA, 'Market Review of OTC Derivative Bilateral Collateralization Practices (2.0)' (n 37) 36–38.

[42] See ibid.

[43] See ibid. As I noted in the Introduction to this Chapter, recent regulatory proposals will probably affect these collateralisation practices in the future. I will examine these new regulatory proposals in Chapter 7.

[44] Sometimes, parties are willing to accept a certain amount of credit risk. Under ISDA documentation, this amount is known as "Threshold". Thresholds and initial margin run in opposite directions and the application of one will exclude the application of the other. See ISDA, MFA and SIFMA, 'Independent Amounts. Release 2.0' (2010) 4. Recent regulatory initiatives have proposed that thresholds do not exceed €50m. See BCBS and IOSCO (ch 1, n 63) 10. For an overview of current market practices in relation to thresholds, See ISDA, 'Market Review of OTC Derivative Bilateral Collateralization Practices (2.0)' (n 37) 36–38.

[45] See ISDA, 'Market Review of OTC Derivative Bilateral Collateralization Practices (2.0)' (n 37) 12.

[46] In exchanged-traded products, the "margin period of risk" (MPR) is usually one or two days. In OTC derivatives, it is normally longer: five, or even seven days. For a detailed analysis of the MPR and the factors affecting its length, see Jon Gregory, *Central Counterparties: Mandatory Clearing*

different formulas, but a fixed amount seems to be the most common practice in the market.[47]

Table 3.2 shows the most recent data on the type of assets that are used to meet collateral requirements in bilaterally cleared derivatives markets. According to these data, market participants rely on securities collateral to meet their initial margin requirements considerably more than in the case of variation margin.[48] In general terms, at the end of 2014, securities collateral represented approximately 23% and 22% of all collateral received and delivered, respectively.[49] In these cases, the parties will typically apply a haircut to hedge against the possibility of the market value of the collateral assets dropping during the margin period of risk.[50]

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*and Bilateral Margin Requirements for OTC Derivatives* (John Wiley & Sons Ltd 2014) 152–154. Recent international standards have proposed that a time horizon of at least ten days is assumed for close-out in bilaterally cleared derivatives. See BCBS and IOSCO (ch 1, n 63) 12.

[47] See ISDA, 'User's Guide to the ISDA Credit Support Documents Under English Law' (ISDA 1999) 36. The parties may want to link the initial margin to other factors such as a credit-related event, e.g. a downgrade by a renowned credit rating agency. See ISDA, 'User's Guide to the 2001 ISDA Margin Provisions' (ISDA 2001) 17. For an overview of the regulatory requirements for quantitative models used to calculate initial margins in bilaterally cleared derivatives, see BCBS and IOSCO (ch 1, n 63) 12–15.

[48] At the end of 2014, 44.5% and 35.2% of collateral received and delivered to meet initial margin requirements was in the form of securities. See ISDA, 'ISDA Margin Survey 2015' (Introduction, n 4) 13.

[49] At the end of 2014, government securities represented, approximately, 13.5% and 18% of all collateral received and delivered, respectively. Other securities, mainly government agency debt securities, corporate bonds and equities, represented approximately 10% and 4% of all collateral received and delivered, respectively. See ibid 9.

[50] For example, if the parties agree that securities of a certain type will bear a haircut of 5%, the collateral provider will need to transfer a portfolio of those securities with a market value of £105 to collateralise an obligation of £100. The parties will typically specify any applicable haircuts in the relevant financial collateral arrangement. In the NY CSA and the ENG CSA, haircuts are defined as "Valuation Percentages". See ISDA, 'NY CSA' (ch 1, n 57) 12; ISDA, 'ENG CSA' (ch 1, n 87) 10. A recent regulatory initiative has proposed a framework to introduce a floor on haircuts.

Table 3.2. Type of collateral assets posted as collateral in bilaterally cleared derivative transactions[51]

| | Received | | | Delivered | | |
|---|---|---|---|---|---|---|
| | Cash | Govt securities by issuer | Other Securities | Cash | Govt securities by issuer | Other securities |
| Independent Amount (IA) | 55.4% | 24.2% | 20.3% | 64.7% | 11.1% | 24.1% |
| Variation Margin | 77.2% | 16.3% | 6.4% | 75.3% | 21.4% | 3.3% |
| Commingled IA and VM | 71.7% | 12.0% | 16.3% | 76.4% | 20.9% | 2.8% |

Normally, market participants exchange initial margin on a unilateral basis, or they do not exchange it at all. Hedge funds will normally be required to post initial margin to the dealer banks. Non-dealer banks may be required to post initial margin below certain ratings. Moreover, bilaterally cleared derivatives among dealers and between dealers and sovereign, supra-national or local authorities do not typically require initial margin.[52] In some cases, initial margin may need to be segregated from any variation margin posted by the collateral provider.[53]

The collateral taker under a bilaterally cleared derivative may hold a right to re-use received collateral. If she receives the collateral under a TTCA such as the ENG CSA, she will have an implicit right to re-use. If she receives the assets under a SICA such as the NY CSA, the parties' agreement will need to grant such right

[51] Source: ISDA, 'ISDA Margin Survey 2015' (Introduction, n 4) 13.

[52] See ISDA, 'Market Review of OTC Derivative Bilateral Collateralization Practices (2.0)' (2010) 36–38. For an overview of some of the factors that the parties will normally take into account when deciding whether to include IA or not, see ibid 43.

[53] Collateral assets posted as initial margin may be segregated in three different ways: directly on the books of the collateral taker, on the books of a third-party, or through a tri-party custodial arrangement. See ISDA, MFA and SIFMA (n 44) 7–8. In a tri-party custodial arrangement, the third party custodian will be in privity with both counterparties, unlike a third-party custodial arrangement, where only one of the counterparties will be in privity with the custodian. See ibid 9–10. Tri-party custodial arrangements require the segregation of initial margin from the rest of the collateral posted by the collateral provider. See ISDA, 'Independent Amount Segregation: Summary of ISDA's Sample Tri-Party IA Provisions (Memorandum)' 4 <http://www.isda.org/publications/isdacredit-users.aspx>. The 2013 version of the NY SCSA provided for a single collateral pool and was amended to accommodate the possibility of segregating initial margin. See ibid. Table 3.1 shows that variation margin is more likely to be commingled with initial margin when it is transferred in the form of cash.

expressly. It is important to note that the NY CSA grants the collateral taker that right by default.[54] If they want to exclude it, the parties will need to do so expressly.

The relatively high ratios of received collateral assets that are eligible for re-use, as illustrated in Table 3.3, suggest that the collateral taker will normally enjoy such a right to re-use collateral, particularly in relation to cash and government securities.[55] Moreover, this data suggests that re-use of received collateral is quite common. This is particularly true for large and medium-size market participants.[56] For example, at the end of 2014, large participants had re-used 90.9% of cash collateral, 72.4% of government securities collateral, and 50% of other securities collateral, as a percentage of received collateral that was eligible to be re-used.[57] Medium-size participants, 77,3%, 36.9% and 56.5%, respectively. [58] Small participants reported zero levels of collateral re-use.[59]

Table 3.3. Collateral that is eligible to be re-used vs. actually re-used (as % of total received, end of 2014)[60]

| | Cash | Govt securities by issuer | Other securities |
|---|---|---|---|
| Total received (USD millions) | 855,508 | 155,059 | 109,629 |
| ELIGIBLE to be rehypothecated | 91.6% | 77.7% | 53.2% |
| ACTUALLY rehypothecated | 82.2% | 52.8% | 26.9% |

[54] See ISDA, 'NY CSA' (ch 1, n 57) 6(c).

[55] Such right to re-use collateral will be implicit in the ENG CSA, where the collateral provider transfers full title over the collateral assets. Under the NY CSA, the collateral provider, who will only grant a security interest over the collateral assets, will need to agree expressly to the conferral of such right to re-use. Paragraph 6(c) of the NY CSA provides for such agreement by default.

[56] The ISDA Margin Survey classifies survey participants according to the number of active bilaterally cleared derivative agreements: large (more than 3,000), medium (between 100 and 3,000), and small (less than 100). See ISDA, 'ISDA Margin Survey 2015' (Introduction, n 4) 5.

[57] See ibid 14.

[58] See ibid.

[59] See ibid.

[60] Source: ibid.

The right to re-use will give collateral takers in derivatives markets the opportunity to dispose of collateral assets for a myriad purposes. For example, they will be able to re-use the securities collateral to cover a short sale, to raise finance in the securities financing markets, or to transfer that securities collateral to collateralise their obligations under other derivatives transactions. This latter possibility will be particularly attractive to derivatives dealers, who stand as market makers in OTC derivatives markets. If a dealer seeks to hedge its exposure to a new derivative trade by seeking to enter into an offsetting transaction with another trader, having the right to dispose of collateral assets received under the first transaction could facilitate the dealer's ability to settle this second transaction.[61] Indeed, it should come as no surprise that derivatives dealers often re-use cash collateral collected under a bilaterally cleared derivative to meet their collateral obligations with other derivatives counterparties, including a CCP.[62]

## III. The role of collateral re-use in centrally-cleared OTC derivatives

An OTC derivatives contract may also be cleared through a CCP.[63] In this case, the two parties to the transaction will interpose a CCP between them through a process

[61] '[T]he scope of the dealer market model is constrained by capital. Market and credit risk exposures must either be hedged or collateral must be posted against potential losses.' Bliss and Kaufman (n 22) 61. If dealers are able to re-use their counterparties' collateral assets, they will not need to use their own. Effectively, collateral re-use can potentially lift the constraints on the size of derivatives markets and the dealers that support them.

[62] See ISDA, 'ISDA Margin Survey 2013' (ch 1, n 104) 8. Derivatives dealers will often stand as clearing members of a derivatives CCP to clear their derivatives positions, and, sometimes, even those of their clients. As clearing members, they will be liable to transfer collateral to the CCP when necessary; both on their behalf, and on behalf of their clients, if applicable. I will explore the process of central clearing in OTC derivatives in greater detail in the next section.

[63] In the U.K., the main clearinghouse for interest rate swaps is LCH SwapClear. As of 2009, LCH Clearnet affirmed that it cleared 50% of global OTC interest rate swaps. See Duffie and Zhu (n 22) 14. For data on the average daily notional value of contracts cleared by LCH SwapClear, see Rahman

of novation. As a result of novation, the contract between the original counterparties will be replaced with two new ones where the CCP will stand as a seller to the original buyer, and as a buyer to the original seller.[64]

Central clearing presents two important benefits for individual market participants.[65] First, they will no longer be exposed to the credit risk of their many different counterparties, but only to the credit risk of the CCP. This is likely to reduce the information costs associated with the ex-ante assessment of counterparty credit risk. Moreover, if the CCP is well capitalised, the losses arising from a potential default are likely to be relatively small.[66] Second, central clearing allows market participants to reduce their exposures through multilateral netting.[67]

By standing as a counterparty to the original buyer and seller, the CCP enters into two offsetting positions.[68] In principle, that will isolate the CCP from market

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(n 4) 289. ICE Clear Europe is the main clearinghouse for CDS contracts. For an updated and detailed list of the CCPs that have been authorised to operate in the E.U., see ESMA, 'Central Counterparties' <https://www.esma.europa.eu/policy-rules/post-trading/central-counterparties> accessed 16 August 2016. In the U.S., derivatives clearinghouses normally receive the name of "Derivatives Clearing Organizations" (DCOs). The ICE Group and the CME Group maintain leading DCOs in the U.S. For an updated list of the DCOs that are authorized to operate in the U.S., see U.S. Commodity Futures Trading Commission, 'Derivatives Clearing Organizations' <http://sirt.cftc.gov/sirt/sirt.aspx?Topic=ClearingOrganizations> accessed 16 August 2016.

[64] See e.g. LCH.Clearnet Ltd, 'General Regulations of LCH.Clearnet Ltd.' s 12 <http://www.lch.com/rules-regulations/rulebooks/ltd> accessed 19 June 2016.

[65] Other important benefits of central clearing include an increase in price transparency and the portability of a participant's positions if its clearing member were to default. For a detailed analysis of the advantages of central clearing, see Gregory (n 46) 240–241. The relationship between a clearing member and its clients is explored further below in this section.

[66] A CCP uses several loss sharing mechanisms to minimise the effect of a default by one of its clearing members. Effectively, these mechanisms are layers of financial resources on which the CCP can draw to continue its operation. These mechanisms include: collected initial margin, default fund contributions, calls on additional capital from the clearing members, and the CCP's own capital. Collectively, these mechanisms are often referred to as a "default waterfall". Some of these mechanisms are explored later in this Section. For a detailed analysis of all these mechanisms, however, see Duffie, Li, Lubke (ch 3, n 3) 7-9, 21-24.

[67] Multilateral netting provides a solution to the problem of redundant trades that are necessary to exit a position under a bilaterally cleared derivative contract. The topic is beyond the scope of this project. For a detailed description of how multilateral netting operates, see Gregory (n 46) 65–73.

[68] '[T]he number of long positions will equal the number of short positions to which the CCP is a party, just as the number of long and short positions across the market as a whole cancel out.' Bliss and Steigerwald (n 2) 25. Importantly, however, these "offsetting" transactions will not eliminate

risk. However, as a counterparty to both the original buyer and seller, it will be exposed to the risk that either or both of them will default.

CCPs mitigate their credit risk exposure through several reinforcing mechanisms, e.g.: access restrictions, risk management tools such as collateral, and loss mutualisation.[69] Access restrictions allow CCPs to select the counterparties with which they want to trade. This allows them to 'limit their risk exposure to those parties that they are able to monitor.'[70] Typically, CCPs will have a list of requirements that market participants will need to meet in order to be eligible to trade with the CCP. I shall refer to those participants that meet the eligibility requirements as "clearing members". These will typically include large dealer banks.[71] Non-clearing members willing to clear their transactions through the CCP will have to do so through one of the clearing members.[72] Only the latter will be liable vis-à-vis the CCP for the fulfilment of any clearing obligations.[73]

Collateralisation is probably the main risk mitigation technique. In the E.U. and the U.S., new regulations now require that CCPs collect collateral to cover their exposures to clearing members.[74] As in the case of bilaterally cleared derivatives, collateral aims to mitigate the counterparty credit risk of the CCP by transforming it

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counterparty credit risk. The CCP will remain exposed to the credit risk of its counterparties under each of the two transactions.

[69] See ibid.

[70] ibid.

[71] Smaller market participants may find compliance with the access requirements too costly and decide to clear their trades indirectly through the clearing member. See Gregory (n 46) 207.

[72] The clearing client will contract with the clearing member, who will contract with the CCP. In Europe, this is normally done on a principal-to-principal basis, whereas, in the U.S., it is normally done on an agency basis. See Louise Gullifer, 'Compulsory Central Clearing of OTC Derivatives' in Louise Gullifer and Stefan Vogenauer (eds), *English and European perspectives on contract and commercial law: essays in honour of Hugh Beale* (Hart Publishing 2014) 385. For a description of how these two models work, see Gregory (n 47) 208–209.

[73] See LCH.Clearnet Ltd, 'Clearing Membership Agreement'.

[74] In the E.U., for example, see EMIR, art 46(1). In the U.S., see e.g. Commodity Exchange Act, s 7a–1(c)(2)(D)(iv).

into a series of risks that are easier to manage. As a counterparty to all trades, the CCP will act as a calculation agent, valuing the different positions and determining the collateral obligations under each transaction.[75] It will also collect (or transfer) collateral from (or to) the clearing members as appropriate.

The CCP will collect collateral in two forms: variation margin and initial margin. As in bilaterally cleared derivatives, variation margin will cover the exposure of market participants to fluctuations in the market value of their positions. Every day, the CCP calculates the market value of the relevant positions and requests that clearing members that are out-of-the-money post variation margin to the CCP to cover their positions.[76] Variation margin will normally be in the form of cash.[77] Under certain circumstances, CCPs may make more than one call for variation margin during the day.[78] However, they will only transfer variation margin to clearing members that are in-the-money once: generally, at the end of the trading day.[79]

In addition, the CCP will collect initial margin from the clearing members.[80] As in bilaterally cleared derivatives, initial margin will seek to cover any losses that variation margin could potentially leave uncovered. CCPs will also use the "margin period of risk" to calculate initial margin requirements for each clearing member.[81]

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[75] See Gregory (n 46) 149.

[76] See ibid.

[77] At the end of 2014, practically 100% of collateral assets posted by clearing members and their clients to meet variation margin were in the form of cash. See ISDA, 'ISDA Margin Survey 2015' (Introduction, n 4) 17, 19.

[78] See e.g. EMIR, art 41(3). See also LCH.Clearnet Ltd, 'Procedures Section 4. Margin and Collateral' s 1.11. Clearing members may fund this intraday margin on behalf of clients, although the latter often post excess margin with their clearing members to avoid intraday posting. See Gregory (n 46) 209.

[79] See Gregory (n 46) 151–152.

[80] Initial margin is equivalent to the concept of "independent amount" in bilaterally cleared derivatives.

[81] See n 46.

They will normally use other parameters as well,[82] some of which may be linked to the credit quality of the clearing member.[83]

Unlike variation margin, initial margin may be posted using assets other than cash.[84] In fact, clearing members prefer to post non-cash collateral.[85] However, clients seem to be relying increasingly more on cash collateral.[86] Typically, CCPs will apply different haircuts to hedge against the possibility of the market value of the collateral assets dropping during the margin period of risk.[87]

CCPs are required to keep separate records of the positions and collateral assets of clearing members and their clients, and to keep them in separate accounts.[88] Similarly, clearing members are required to keep separate records and accounts that enable them to distinguish, both in accounts at the CCP and in their own accounts, their own positions and collateral assets from those of their clearing clients.[89] In addition, clearing members are required to offer their clearing clients the option to

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[82] See e.g. LCH.Clearnet Ltd, 'Procedures Section 2C. SwapClear Clearing Service' s 1.9.

[83] However, some commentators have emphasized that credit ratings may be unreliable and that triggers linked to credit quality may introduce procyclical effects in the system. See Gregory (n 46) 155.

[84] The CCP will hold securities collateral as a custodian for the clearing member. The CCP may hold securities collateral received from different clearing members in an omnibus account with a custodian bank or in a securities settlement system. In those cases, the CCP will need to ensure that any such account is identified as a custody account. The CCP will also hold any cash collateral received as initial margin as a custodian. See e.g. LCH.Clearnet Ltd, 'Deed of Charge' para 2A. Alternatively, clearing members may be allowed to transfer securities collateral to the CCP through a tri-party arrangement. See e.g. LCH.Clearnet Ltd, 'Procedures Section 4. Margin and Collateral' (n 78) 1.8.

[85] At the end of 2014, 57.9% of collateral assets posted to meet initial margin requirements were in the form of government securities, 34.2% in the form of cash, and 0.4% in the form of other securities. See ISDA, 'ISDA Margin Survey 2015' (Introduction, n 4) 17.

[86] At the end of 2014, 60.1% of collateral assets posted to meet initial margin requirements were in the form of cash, up from a 51.7% at the end of the previous year. At the same time, the delivery of government securities to meet initial margin requirements dropped from 48.2% to 38.3%. See ibid 18–19.

[87] See e.g. EMIR, art 46(1). See also Gregory (n 46) 156–157.

[88] See e.g. EMIR, arts 39(1), 39(9), 39(10). Each client account will typically include two sub-accounts: a position account and a collateral account. See e.g. LCH.Clearnet Ltd, 'Procedures Section 2C. SwapClear Clearing Service' (n 82) 1.4.2. In the U.S., see Commodity Exchange Act, s 6d(f), as amended by Dodd-Frank Act, s 724(a).

[89] See EMIR, arts 39(4), 39 (9), 39(10). In the U.S., see Commodity Exchange Act, s 6d(f), as amended by Dodd-Frank Act, s 724(a).

hold their positions and collateral assets in at least one of two types of accounts: an omnibus account and an individual account.[90] Under an omnibus account, positions and collateral assets of all clients are segregated from those of their clearing member as well as from those of other clearing members.[91] Under an individual account, the positions and collateral assets of one client are segregated from those of other clients of its clearing member, those of its clearing member, and those of any other clearing member.[92]

Clients will keep different accounts at the CCP for variation and initial margin.[93] Typically, variation margin is not segregated.[94] The CCP will normally hold a right to re-use any assets collected as variation margin from counterparties that are out-of-the-money to be able to pass them on to counterparties that are in-the-money.[95] Initial margin, in contrast, is normally transferred under a SICA and will tend to be segregated.[96] However, although in principle CCPs could hold a right to re-use assets collected as initial margin,[97] market practice suggests that this is rare.[98]

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[90] See EMIR, arts 39(5), 39(10). In the U.S., there is a third method of segregation known as the "legally segregated operationally commingled" (LSOC) that seeks to balance the benefits of omnibus and individual accounts. For a detailed discussion, see Gregory (n 46) 223–226.

[91] See e.g. EMIR, arts 39(2), 39(10). Typically, under an omnibus account, margin requirements are calculated on a gross basis, i.e. per client position. However, today, some clearinghouses offer a variation of this "gross" omnibus account where margin requirements are calculated on a net basis across all the clients' positions ("net" omnibus accounts). For a detailed analysis of these two types of accounts, see Gullifer (n 72) 392–393.

[92] See e.g. EMIR, art 39(3), 39(10). Under an individual account, any excess margin collected by the clearing member will also be transferred to the client's individual account in the CCP. See EMIR, art 39(6).

[93] Indeed, the CCP will not offset initial and variation margin in opposite directions. See Gregory (n 46) 226.

[94] See ibid 82.

[95] See ibid.

[96] For example, members of SwapClear will normally grant the clearinghouse a security interest over collateral assets to cover their positions or those of its clearing clients. See LCH.Clearnet Ltd, 'Deed of Charge' (n 84) 3(1). Segregation would be incompatible with the transfer of collateral assets under a TTCA. If the CCP were to receive those assets under a TTCA it should be able to hold them in its own account.

[97] See e.g. EMIR, art 39(8).

Clearing members, on the other hand, will normally request that their clients grant them a right to re-use the collateral assets 'in order that they should be capable of being charged to the Clearing House as collateral'.[99]

Finally, another important mechanism to mitigate counterparty credit risk is loss mutualisation. Clearing members will normally be required to make contributions to a default fund. This fund will be available to the CCP in the event of a clearing member's default to cover any losses that the CCP may face from closing out that clearing member's positions that exceed initial margins.[100] These contributions are made in the form of cash collateral and the clearinghouse will typically pay interest on such cash collateral.[101] In order to fund that interest, clearing houses will normally re-invest that cash collateral by exercising their right to re-use. For example, CCPs are now 'huge players' in reverse repo markets.[102]

As we can see, CCPs will rely on the re-use of cash collateral to meet their variation margin obligations under offsetting transactions, as well as for cash management purposes. However, under current market practices, CCPs hardly ever

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[98] For example, the Deed of Charge whereby a clearing member grants a security interest to LCH.Clearnet to collateralise its obligations with the clearinghouse expressly excludes any right to re-use. See LCH.Clearnet Ltd, 'Deed of Charge' (n 84) 10(3). See also LCH.Clearnet Ltd, 'Consolidated Financial Statements for the Year Ended 31 December 2015' 23.

[99] LCH.Clearnet Ltd, 'Client Consent Form' 1. It is unclear, however, whether such a right to re-use will be strictly necessary when the clearing member is allowed to hold a security interest in the collateral assets, as long as it does not rank above that of the clearinghouse. See e.g. LCH.Clearnet Ltd, 'Deed of Charge' (n 84) 8(2). In this light, even if the client had not granted its clearing member a right to re-use, the latter could still assign its security interest to the clearinghouse, or even sub-charge it, yet waiving its own preference. (It should be noted that terms used in capital letters shall be read as defined under the relevant agreement.)

[100] These contributions are normally calculated for each clearing member on a pro rata basis in relation with initial margins posted, or with total positions held. See Gregory (n 46) 178. For an example of how these default fund contributions might help reduce losses in the event of default, see LCH.Clearnet Ltd, 'Default Rules' s 15 <http://www.lch.com/rules-regulations/rulebooks/ltd> accessed 19 June 2016.

[101] See e.g. LCH.Clearnet Ltd, 'Clearing Membership Agreement' (n 73) 9.2; LCH.Clearnet Ltd, 'Default Rules' (n 100) 17.

[102] See Domanski, Gambacorta and Picillo (n 5) 72. In addition, cash collateral may be re-invested in holdings of 'high quality government, government guaranteed or supranational securities […] or by the placement of cash with central Banks'. LCH.Clearnet Ltd, 'Consolidated Financial Statements 2015' (n 98) 29.

re-use securities collateral. This remains, almost exclusively, a market practice of bilaterally cleared derivatives. In the next Section, I will provide an illustrative transaction to illustrate how securities collateral may be re-used in these markets.

## IV. The collateralisation process: an illustrative transaction

Swaps are the most widely used derivative contract and they are mainly cleared bilaterally.[103] Parties to a swap contract agree to exchange (i.e. swap) a set of payments with certain frequency over a given period of time. Those payments are calculated on the basis of an underlying reference, e.g. the exchange rate between currencies, the interest rate under a debt security or a loan, or the price of a stock or a commodity.

Let us imagine that a company (A) has borrowed £100m from a bank (X) at an interest rate of 4% under a loan contract, and that interest is to be paid yearly. Let us further imagine that, several months into the loan, A expects interest rates to drop significantly and to remain low for some time. Because A is liable to pay a fixed interest rate to X, A will have an incentive to negotiate a variable rate in its loan to benefit from a low interest rate environment. X, however, refuses to change the terms of the loan.

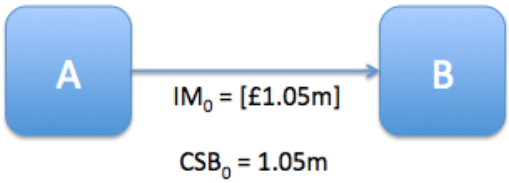
In order to reduce the interest payments under its loan with X, A approaches a dealer bank (B) about the possibility of entering into an interest rate swap transaction. A and B agree to the following terms of the transaction: the swap contract will have a notional amount of £100m to replicate the principal in the loan;

[103] At the end of December 2015, the gross market value of all outstanding swaps contracts was approximately $USD10.9tn, i.e. approximately 75% of the gross market value of all outstanding OTC derivatives. See BIS, 'OTC Derivatives Statistics at End-December 2015' (n 11) 2–6.

on a yearly basis, A will pay B a flexible interest rate (LIBOR+3%) over the notional amount, while B will pay A a fixed interest rate (4%) over the same amount and on the same yearly basis. Under these terms, effectively, A has managed to swap its obligation to pay a fixed interest rate under the loan for an obligation to pay a variable interest rate.[104] They document their swap transaction under an ISDA MA and the relevant Confirmation. The transaction is cleared on a bilateral basis.

In addition, A and B enter into an ENG CSA to collateralise their obligations under the swap transaction. They agree to value their positions on a weekly basis and to exchange cash variation margin to cover the resulting exposures. They also agree that A will post initial margin in the amount of £1m, either in cash or securities.[105] Depending on the collateral assets, specific haircuts may apply. When the transaction is executed, A transfers to B a portfolio of Gilts with a market value of £1.05m, thereby reflecting a haircut of 5%.

Diagram 3.1. Illustrative swap transaction: collateral flows in $t_0$




On the first Valuation Date, the value of each party's position is calculated.[106] B has a positive Exposure of £250,000 and is therefore in-the-money.[107] As a result,

[104] Typically, dealer banks will collect a fee from their derivatives counterparties. However, in this case, I have assumed this fee to be zero for the sake of simplicity.

[105] In interest rate swaps, an initial margin of 1% over the notional amount seems to be common. See Manmohan Singh, 'Collateral, Netting and Systemic Risk in the OTC Derivatives Market' (2010) IMF Working Paper no. 10/99 n 14.

[106] Terms written in Capital Letters should be read as defined in the relevant standard document. For a definition of Valuation Date, see ISDA, 'ENG CSA' (ch 1, n 87) 10.

[107] For a definition of Exposure, see ibid. The term Exposure is often seen as the functional equivalent of variation margin in bilaterally cleared derivatives. See ISDA, MFA and SIFMA (n 44) 3–4.

B will be entitled to hold collateral assets with a total value of £1.3m: £250,000 to cover its current Exposure, and £1.05m as initial margin. Under the ENG CSA, the total amount of collateral that one party is allowed to receive is known as the "Credit Support Amount" (CSAm).[108] In our example, $CSAm_1$ = £1.3m. On that first valuation date, B already holds Gilts in the amount of £1.05m. Under the ENG CSA, the total amount of collateral held by any one party at any point in time is known as the "Credit Support Balance" (CSB).[109] In our example, $CSB_0$ = £1.05m.

On any Valuation Date, the CSB and the CSAm must be the same. The parties will be able to demand that its counterparty transfers collateral for the difference between the two amounts. If $CSAm_t > CSB_{t-1}$, the party that is in-the-money will be entitled to request that its counterparty transfers a Delivery Amount.[110] If $CSAm_t < CSB_{t-1}$, the party that is out-of-the-money will be entitled to request that its counterparty transfers a Return Amount.[111] If we assume that the value of the Gilts that B holds as initial margin has not changed, in our example, B will be entitled to request that A transfers £250,000 in cash as a Delivery Amount. Hence, after the first week, B will hold collateral assets worth £1.3m: £250,000 to cover its current exposure, and £1.05m received as initial margin at the beginning of the transaction. In other words: $CSB_1$ = £1.3m.

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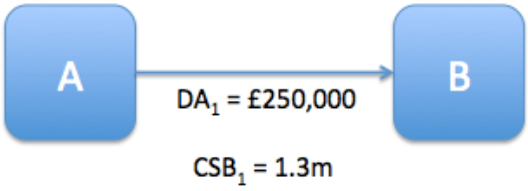
[108] See ISDA, 'ENG CSA' (ch 1, n 87) 10.

[109] See ibid.

[110] See ibid 2(a). The party that is in-of-the-money may be entitled to request that its counterparty transfers a Delivery Amount if the former's Exposure increases or if the value of the assets posted by the latter as initial margin has dropped.

[111] See ibid 2(b). The party that is out-of-the-money may be entitled to request that its counterparty transfers a Return Amount if the latter's Exposure drops or if the value of the assets posted by the former as initial margin has increased.

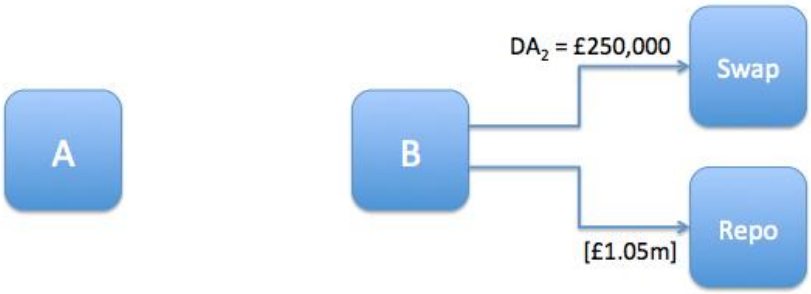
Diagram 3.2. Sample OTC derivative transaction. Collateral flows in $t_1$




Because A and B have used an ENG CSA to document the collateralisation of their swap transaction, A will be transferring to B the full title over any collateral assets. This will give B an implicit right to re-use those collateral assets, subject only to the obligation to return equivalent assets upon A's request.[112]

Let us now imagine that, in the second week of the swap transaction, B decides to dispose of the collateral received from A after the first Valuation Date. For example, it could re-use the cash collateral received to cover its Exposure to meet its own collateral obligations under other derivatives transactions. Moreover, it could raise finance against the received Gilts by posting them as collateral in a bilateral repo transaction. Assuming that neither the positions nor the collateral assets posted under the swap transaction between A and B have changed in value, on the second Valuation Date, the flow of collateral would look something like this:

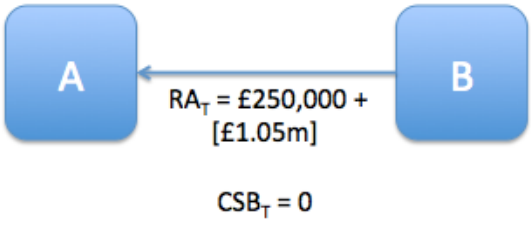
Diagram 3.3. Sample OTC derivative transaction. Collateral flows in $t_2$




[112] Typically, collateral provider will be able to request the transfer of equivalent assets upon the termination of the transaction or as a Return Amount if the value of the collateral assets posted as initial margin had increased. Moreover, the same right would arise if the collateral provider were to substitute collateral already posted. See ibid 3(c).

The last Valuation Date will coincide with the termination date ($t_T$). Let us now imagine that on the penultimate Valuation Date ($t_{T-1}$), the CSB amounted to £1.55m. Because the CSB is larger than the original amount of initial margin, B is still in-the-money and that its Exposure is £500,000.[113] Let us also imagine that, on the last Valuation Date ($t_T$), B's Exposure drops to £250,000 so that $CSAm_T$ = £1.3m. Because $CSAm_T < CSB_{T-1}$, A would be entitled to request that B transfers the difference, i.e. £250,000, in cash. In addition, on the termination date, A will be entitled to request that B returns any initial margin. In other words: on the termination date the CSB must be zero. As a result, A would be entitled to request that B transfers a Return Amount of £1.3m: £250,000 to account for the reduction of B's Exposure, and assets that are equivalent to those originally transferred as initial margin for an amount of £1.05m.

Diagram 3.4. Illustrative OTC derivative transaction. Collateral flows in $t_T$




As we can see, under a TTCA such as the ENG CSA, collateral assets are likely to flow between different participants and markets to meet different obligations. We would observe similar dynamics if the swap transaction were documented under a SICA where the collateral taker enjoyed a right to re-use collateral, e.g. the NY CSA. In principle, because the collateral taker is only obliged

[113] I assume that the value of the Gilts posted as initial margin has not changed.

to return equivalent assets to the collateral provider, the same collateral asset could be used under different transactions, thereby forming a collateral chain, as illustrated in Diagram 3.3 linking A, B and any potential onward collateral takers.

# V. Conclusion

Collateral re-use plays a central role in modern-day OTC derivatives markets. For example, it supports the role of derivatives dealers as market makers. In bilaterally cleared derivatives, a right to re-use will facilitate the ability of derivatives dealers to stand as market makers since they will be able to dispose of collateral received from one trader to collateralise a hedging transaction with another trader. Collateral re-use will also facilitate their market making function in centrally-cleared OTC derivatives since dealers will normally re-use their clients' assets to meet the collateral requirements set by the CCP. Of course, when possible, derivatives dealers may also dispose of that collateral for many other purposes, e.g. to raise finance against received securities collateral in the SFTs market, or to cover short sales.

CCPs also rely on collateral re-use to provide their clearing services; particularly cash collateral. For example, they will normally re-use received variation margin, which is mainly posted in the form of cash, to meet their own variation margin obligations. A CCP will also have a right to re-use cash collateral posted by clearing members to contribute to the CCP's default fund. However, CCPs, unlike derivatives dealers, will hardly ever re-use securities collateral.

The scope of this dissertation is restricted to the re-use of securities collateral. For that reason, the analysis that follows in the next Chapters will only focus on bilaterally-cleared derivatives.

In spite of its current popularity, the re-use of securities collateral in OTC derivatives markets is a rather recent phenomenon. Like in the case of SFTs, re-using collateral in OTC derivatives markets historically faced considerable legal uncertainty. In the next Chapter, I examine the main regulatory reforms that sought to remove this uncertainty in the U.K. and the U.S., and will describe the rationale behind them.

# Chapter 4. The Regulatory Rationales for Protecting and Promoting Collateral Re-use

## I. Introduction

As illustrated in the previous two Chapters, today, collateral reuse in securities financing and OTC derivatives markets is widespread. However, in the recent past, the ability of participants in these markets to re-use collateral faced considerable legal uncertainty.

In the U.S., most commentators opined that the parties to a security interest collateral arrangement (SICA) would be able to agree on the collateral taker's right to re-use, but that such an agreement would probably be re-characterised as a title transfer collateral arrangement (TTCA).[1] The enforceability of TTCAs, however, was far from certain, particularly in the context of insolvency.

The case of repos, arguably the most prominent example of TTCAs, is very illustrative. During the 1970s and early 1980s, in the early years of repo markets in the U.S., different courts had characterised repos as either secured loans or outright transfers depending on the circumstances of the case.[2] The opinion of legal scholars

[1] For a detailed analysis of the right to re-use collateral under U.S. law, see Chapter 1, Section III.A.

[2] For an overview of different court decisions characterising repos as secured loans and outright transfers, see Elizabeth M Osenton, 'Need for a Uniform Classification of Repurchase Agreements: Reconciling Investor Protection with Economic Reality, The' (1986) 36 American University Law Review 669, n 10. In general, courts might re-characterise repos as secured loans if '(i) the parties

was also divided.[3] This uncertainty was particularly acute in the context of bankruptcy: by the early 1980s, no bankruptcy court had explored the characterisation of repos in a bankruptcy proceeding.[4]

Lawyers were seriously concerned about this legal uncertainty.[5] Nevertheless, participants in the repo markets operated under the assumption that the repo buyer (i.e. the collateral taker), as receiver of full title to the securities collateral, would be able to re-use those securities subject only to the obligation to return equivalent securities upon the repo seller's (i.e. the collateral provider's) discharge of her obligation.[6] Similarly, participants assumed that in the event of the collateral provider's insolvency, the collateral taker would be able to realise the collateral and offset her obligation vis-à-vis the collateral provider.[7]

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intended the transaction to have the legal nature of a pledge regardless of its form or (ii) the legal nature of the transaction in substance is a pledge regardless of the parties' intent[.]' Royston Miles Goode, Hideki Kanda and Karl Kreuzer, 'Explanatory Report on the Hague Convention on the Law Applicable to Certain Rights in Respect of Securities Held with an Intermediary' (2006) 2.19.

[3] In favour of the characterization of repos as secured loans, see e.g. Osenton (n 2); Gary Walters, 'Repurchase Agreements and the Bankruptcy Code: The Need for Legislative Action' (1983) 52 Fordham Law Review 828. In favour of the characterization of repos as sale and repurchase transactions, see e.g. William F IV Hagerty, 'Lifting the Cloud of Uncertainty over the Repo Market: Characterization of Repos As Separate Purchases and Sales of Securities' (1984) 37 Vanderbilt Law Review 401.

[4] See Kenneth Garbade, 'The Evolution of Repo Contracting Conventions in the 1980s' (2006) 12 Economic Policy Review 35.

[5] In July 1982, Thomas Russo, a prominent attorney in private practice in New York, observed that '[t]he most important legal uncertainty concerning repos […] is whether they will ultimately be characterized for purposes of [bankruptcy law] […] as secured loans or as independent contracts for the sale and repurchase of securities.' ibid.

[6] For example, Drysdale Government Securities, Inc. relied on its ability to sell the collateral securities received under repos to exploit a pricing anomaly in the repo market. Eventually, this strategy was the primary cause of the firm's failure in May of 1982. For further details on the firm's strategy and the relevance of its right to re-use securities collateral, see Hagerty (n 3) 408–409.

[7] See e.g. 'Bankruptcy Reform: Hearing before the Subcommittee on Courts of the Committee on the Judiciary, U.S. Senate, 98th Congress, 1st Session' (1983) 308. The divergence in their opinions does not mean that bankers did not consult with their lawyers. They simply seemed reluctant to conceive 'that a transaction [could be] set aside on a technicality or formality which would not be evident to a reasonably well-informed person.' 'London's Legal Liabilities.' [1992] The Economist (US) 77 <http://www.highbeam.com/doc/1G1-11875238.html> accessed 29 May 2015. As the chairman of one bank expressed it: 'To me […] a contract is a contract, and I was brought up to honour contracts.' Philip Moore, Cleaning Up the Town Hall Mess, Euromoney, Apr.1991, at 31, cited in Henry TC Hu, 'Misunderstood Derivatives: The Causes of Informational Failure and the Promise of Regulatory Incrementalism' (1993) 102 The Yale Law Journal 1457, 1490. Hu has pointed to irrational behaviour

On 16 September 1982, the U.S. Bankruptcy Court for the Southern District of New York in the case of Lombard-Wall, Inc., a small government securities dealer active in the repo market, announced that it would characterise repos as secured loans.[8] This re-characterisation shattered the assumptions on which repo markets had been developing in the preceding years. As I shall describe later on in the Chapter, the Lombard-Wall decision led the financial services industry and the Fed, to try to convince the U.S. Congress to validate those assumptions.[9]

In the U.K., the situation was somewhat different. The compatibility of a right to re-use with the nature of a security interest was far from certain.[10] This led the financial services industry in the U.K. to rely predominantly on TTCAs,[11] which courts had traditionally recognised and enforced as legitimate financing devices.[12] However, as London consolidated itself as an international financial hub, attracting high volumes of cross-border transactions, the financial services industry became

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in the form of cognitive biases as a possible explanation for market participants' disregard of legal risks. For a detailed analysis, see ibid 1487–1495.

[8] See *Lombard-Wall Incorporated v. Columbus Bank & Trust Co. et al. (In re Lombard-Wall Incorporated),* No. 82 B 11556, Bankr. Ct., S.D.N.Y., bench decision, September 16, 1982, cited in 'U.S. Senate Report to Accompany S. 445' (1983) Report No. 98-65 47.

[9] Mr. Sternlight and Mr. Ringsmuth, Executive Vice President and Assistant General Counsel of the Federal Reserve Bank of New York (FRBNY), respectively, testified before the U.S. Congress to support the proposal to introduce amendments to the U.S. Bankruptcy Code that would address the problem of characterisation of repos. Mr. Strauss, Chairman of the Government and Federal Agency Securities Division, on behalf of the Public Securities Association (PSA), also testified in the same hearings. The PSA was a national trade association representing 300 banks and brokers and dealers who underwrite and sell U.S. Government and Federal agency securities. It is one of the predecessors of the Securities Industry and Financial Markets Association (SIFMA), the largest financial services industry trade group in the U.S. See Securities Industry and Financial Markets Association, 'History' (*SIFMA*) <http://www.sifma.org/about/history/> accessed 13 December 2016. During his testimony, Mr. Strauss introduced himself as the spokesperson for 'the PSA and virtually the entire financial industry, including banks, State and local governments, and pension funds'. 'Bankruptcy Reform: Hearing before the Subcommittee on Courts of the Committee on the Judiciary, U.S. Senate, 98th Congress, 1st Session' (n 7) 307. The records from these hearings also include several letters from the then Chairman of the Fed, Mr. Paul Volcker, supporting the proposed amendment to the U.S. Bankruptcy Code.

[10] See e.g. ISDA, 'Collateral Arrangements in the European Financial Markets: The Need for National Law Reform (United Kingdom Country Report)' (2000).

[11] See ISDA, 'Collateral Arrangements in the European Financial Markets: The Need for Financial Law Reform' (2000) 6 <http://www.isda.org/c_and_a/collateral-Financial.html>.

[12] See Joanna Benjamin, 'Recharacterisation Risk and Conflict of Laws' (1997) 12 Journal of International Banking & Financial Law.

more concerned with the recognition and enforceability of TTCAs under the laws of other jurisdictions, particularly in the context of insolvency.[13] For example, in accordance with English rules of private international law, English courts might be required to apply foreign law that does not recognise TTCAs.[14] Additionally, foreign courts might themselves re-characterise TTCAs in application of those laws.[15]

In 1996, the Belgian Supreme Court crystallised those fears when it rejected the enforceability of a TTCA under Belgian law.[16] Like in the U.S., this court decision led the financial services industry and the relevant central banks to try to persuade regulators to protect the collateralisation of cross-border financial transactions within the E.U.

This Chapter explores the arguments that representatives of the financial services industry and the relevant central banks in the U.S. and the E.U. wielded to persuade regulators to protect financial collateral arrangements. It also describes how the industry's concerns affected, directly or indirectly, the collateral taker´s right to re-use under those arrangements. Section II explores these arguments in detail. It will do so in relation to SICAs and TTCAs separately. Section III will describe how regulators in the U.S. and the E.U. embraced the narrative wielded by the industry. Section IV explores the limitations of this narrative, and describes how considerations of efficiency eclipsed these limitations in the policy debate. Section V concludes with a summary of the main points.

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[13] See ibid.

[14] For a detailed analysis of the application of English rules of private international law to cross-border collateralised transactions, see ibid.

[15] See ibid.

[16] In its decision of 17 October 1996 (the *Sart-Tilman* case), the Belgian Supreme Court struck down the assignment of the insolvent's rights to receive various subsidies to a bank as collateral. The Supreme Court understood that such an outright transfer violated the *pari passu* principle. For a detailed analysis of the decision, see ibid.

# II. Concerns of the financial services industry

## A. Legal restrictions on the right to re-use collateral under SICAs

In the late 1990s, different representatives of the financial services industry in the U.K. identified several aspects of the law applicable to SICAs that they considered problematic. These aspects included: i) legal restrictions on the right to re-use collateral; and ii) the application of imposed formal rules for the creation, perfection, implementation and enforcement of security interests.[17]

Legal practitioners and scholars differed in their opinions about the validity of the collateral taker's right to re-use collateral included in a SICA under English law.[18] Although a mortgagee may have a right to possession from the moment that the mortgage is executed, some commentators argued that this right was subject to certain equitable rules and could not be equated to a right to re-use.[19] The mortgagor's "equity of redemption" is one such rule. This doctrine 'will permit of no attempt to clog, fetter, or impede the borrower's right to redeem and to rescue what was, and still remains in equity his own.'[20] In light of this common law rule, the collateral taker's right to re-use would seem like a clog on the mortgagor's equity of redemption: if the collateral taker were to transfer the collateral assets to a third

[17] See e.g. ISDA, 'UK Country Report' (n 10).

[18] In the early 2000s, the conferral of such a right to re-use was still a rather rare phenomenon, associated mostly with TTCAs underpinning repos and securities loans, and there was no clear position amongst practitioners. See The City of London Law Society Financial Law Sub-Comittee, 'Directive on Financial Collateral Arrangements: Replies to Questions from H.M. Treasury Contained in Note of April 2003 Setting out Initial Policy and Legal Questions' 14 <http://www.fmlc.org/uploads/2/6/5/8/26584807/1c.pdf>. See also ISDA, 'UK Country Report' (n 10) 4.

[19] See e.g. Benjamin, *Interests in Securities* (ch 1, n 9) 5.50–5.54; McCormack (ch 1, n 68) 99.

[20] *Marquess of Northampton v Pollock* (1890) 45 Ch D 190, 215. This rule was developed for legal mortgages, but it may also apply to other types of security interest. See Benjamin, *Interests in Securities* (ch 1, n 9) 5.53.

party, the collateral provider would effectively lose any interest in them.[21] If the right to re-use were regarded as a breach of that equity rule, courts could re-characterise SICAs including a right to re-use as TTCAs.[22] In the context of certain financial markets, these equity rules were seen as a burden.[23]

According to ISDA, the collateral taker under a SICA would not be allowed to re-use collateral in the vast majority of E.U. jurisdictions.[24] Yet, at the time, most financial institutions holding collateral in the form of fungible securities considered it "commercially imperative" to have the right to re-use collateral assets.[25] The right to re-use financial collateral would give the collateral taker the opportunity 'to use [that collateral] most efficiently, lowering its own costs and therefore the cost of financial services provided to the collateral provider'.[26] The European Central Bank (ECB) also supported this argument in an Opinion issued on 13 June 2001 at the

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[21] It is generally believed that the collateral provider cannot waive her equity of redemption by contract. See Benjamin, *Interests in Securities* (ch 1, n 9) 5.54. This principle is often summed up as "once a mortgage, always a mortgage": 'The right of redemption is considered in equity as inseparably incident to a mortgage, and cannot be restrained by any clause or agreement whatever, it being a rule, that what was once a mortgage must always continue a mortgage.' *Spurgeon v Collier* (1758) 28 ER 605, 607. A more liberal view contended that the parties were free to agree on the mortgagee's power of sale even without default. In that case, the collateral provider's equity of redemption would attach to the proceeds arising from such re-use. See Goode, *Legal Problems of Credit and Security* (ch 1, n 102) 6–30. This, however, seemed to be a minority position. See Keijser (n 8) 205. A few cases in the late XIX$^{th}$ century and early XX$^{th}$ century seemed to defend the argument that the disposal of fungible collateral assets such as securities would not constitute a breach of the rules against clogs on the equity of redemption. See Benjamin, *Interests in Securities* (ch 1, n 9) 5.63. Yet, the resulting exposure of the collateral provider to counterparty credit risk would seem incompatible with such equity rule. See ibid 5.64. Other contractual alternatives to coordinate collateral re-use with a security interest had been discarded as impractical. See ibid 5.57–5.60.

[22] See e.g. Benjamin, *Interests in Securities* (ch 1, n 9) 5.51–5.56.

[23] See ibid 5.67–5.70.

[24] According to ISDA, 'In all European jurisdictions other than England, Greece and Ireland, it is not possible for a pledgee to use the pledged assets as though it were the absolute owner of those assets.' ISDA, 'Collateral Arrangements in the European Financial Markets: The Need for Financial Law Reform' (n 11) 7. Nevertheless, the effects of such re-use in England and Ireland were unclear. See ibid. The collateral taker's right to re-use was subject to debate in Germany. In Italy, the collateral taker seemed able to re-use collateral under an irregular pledge. Its nature, however, did not appear to be that of a security interest in the normal sense. See ibid.

[25] See ISDA, 'Collateral Arrangements in the European Financial Markets: The Need for Financial Law Reform' (n 11) 6.

[26] ibid.

request of the Council of the European Union concerning a European Commission proposal for a new Directive on financial collateral.[27]

Moreover, the industry argued that collateral re-use 'would increase the liquidity in the securities markets'.[28] Liquidity is generally regarded as a reflection of the availability of assets in the market and a trader's ability to move those assets without destabilising their price.[29] The right to re-use collateral under repo and securities lending transactions allows dealer banks to create markets in those securities received as collateral. For example, they use securities loans to source securities that they can then re-use to transfer to their institutional clients.[30] Any restriction on dealers' rights to re-use securities collateral could therefore hinder their ability to make those securities available and, as a result, undermine their liquidity.[31]

In the U.S., these issues were not a serious concern. As we saw in Chapter 1, UCC §9-207(c)(3) expressly recognises the right of the collateral taker to re-hypothecate collateral. Despite the absence of a statutory provision recognising the collateral taker's right to re-use collateral under a SICA, most commentators opined that the parties could expressly agree to grant the collateral taker such a broad right to re-use. Yet, such an agreement would be incompatible with security interests as

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[27] See ECB, 'Opinion of the European Central Bank (ECB) of 13 June 2001 at the Request of the Council of the European Union Concerning a Proposal for a Directive of the European Parliament and of the Council on Financial Collateral Arrangements' (2001) (CON/2001/13) para 16 <http://eur-lex.europa.eu/legal-content/EN/HIS/?uri=CELEX:32002L0047>.

[28] EFMLG, 'Proposal for an EU Directive on Collateralisation' (2000) 5 <http://www.efmlg.org/Docs/Documents/2000%20June%20EFMLG%20Proposal%20for%20an%20EU%20Directive%20on%20Collateralisation.pdf>. The ECB also supported this argument. See ECB, 'ECB Opinion on the FCD Proposal' (n 27) 16.

[29] Brunnermeier and Pedersen refer to this type of liquidity as "market liquidity". See Markus K Brunnermeier and Lasse Heje Pedersen, 'Market Liquidity and Funding Liquidity' (2009) 22 Review of Financial Studies 2201, 2202.

[30] For a more detailed analysis of repos and securities loans and the role of collateral re-use in them, see Chapter 2.

[31] The degree to which a restriction on the dealers' right to re-use will ultimately affect their market making capabilities will depend on the extent to which they rely on collateral re-use as a source of securities.

regulated under Article 9 of the UCC and, consequently, courts could re-characterise it as a TTCA. When collateral is in the form of securities, those TTCAs would fall out of the scope of Article 9 of the UCC. Other provisions, such as those included under Article 8 of the UCC, would typically apply.

In the U.K., the industry also considered that the application of formal requirements for the creation, perfection, implementation and enforcement of security interests in the U.K. led to considerable uncertainty in the context of financial transactions.[32] For example, the perfection of security interests granted by a company over its assets generally required registration in the Company Charges Register pursuant to Section 395 of the Companies Act of 1985.[33] At the time, there was considerable uncertainty surrounding the registration of charges over cash and securities.[34] To avoid the risk of being unprotected against the collateral provider's default, many charges were registered as a precautionary measure.[35] On the other hand, in the U.S., the valid creation of security interests was relatively straight-forward.[36]

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[32] See ISDA, 'UK Country Report' (n 10) 4. At the E.U. level, this uncertainty was aggravated by the diversity of conflict of laws rules as to the substantive law that would apply to a collateral arrangement for purposes of creation, perfection, maintenance and enforcement of the arrangement. See ISDA, 'Collateral Arrangements in the European Financial Markets: The Need for Financial Law Reform' (n 11) 3. ISDA also noted that the application of these formal requirements to each collateral transfer 'would clearly be burdensome, costly and impractical given the volume of securities transfers normally entailed by modern collateral arrangements, particularly under mark-to-market collateral arrangements.' ibid 6.

[33] Since its enactment, the Companies Act of 1985 has been subject to several modifications, most notably by the Companies Act of 2006. Unless otherwise specified, any references to the Companies Act of 1985 will be to its original version.

[34] This uncertainty stemmed from two problems: first, the difficulty of determining whether a charge was fixed or floating, as in the latter case it was subject to registration pursuant to section 396(1)(f) of the Companies Act 1985; second, determining the circumstances under which a charge over book debts would be registrable pursuant to section 396(1)(e) of the same Act. See Louise Gullifer, 'What Should We Do about Financial Collateral?' (2012) 65 Current Legal Problems 386–388.

[35] See ibid 387.

[36] Under U.S. law, security interests are normally perfected by control. For a detailed discussion of perfection under U.K. and U.S. law, see Chapter 1.

These legal difficulties, together with the uncertainty that surrounded the recognition and enforceability of a collateral taker's right to re-use collateral under a SICA, put U.K. banks at a disadvantage against their counterparties in the U.S.[37] The financial services industry in the U.K. reacted by relying on TTCAs,[38] which provide an implicit right to re-use collateral and are normally not subject to as many formal requirements as security interests are.[39] In addition, the validity and enforceability of TTCAs under English law was unquestioned. There was a considerable body of case law that regarded TTCAs as legitimate financing techniques.[40] Few agreements were re-characterised as imperfect security interests.[41] That collateral be transferred for the purpose of providing security to the collateral taker was not enough to justify the re-characterisation of an outright collateral transfer under English law.[42] Nevertheless, as I shall describe in the next sub-section, TTCAs faced an important drawback under English law: the risk of being re-characterised as security interests, particularly in the context of insolvency under foreign substantive laws. Interestingly, despite the

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[37] See Benjamin, *Interests in Securities* (ch 1, n 9) 5.70.

[38] See Benjamin, 'Recharacterisation Risk and Conflict of Laws' (n 12) 514. The reliance on TTCAs is particularly big in the U.K. markets for SFTs and OTC derivatives. For a detailed description of the collateralisation practices in these markets, see Chapters 2 and 3, respectively.

[39] See Benjamin, *Interests in Securities* (ch 1, n 9) 5.49, 5.67.

[40] For a detailed list of references, see ibid 6.53.

[41] The main reasons behind the re-characterization of TTCAs were: the written agreement being a sham that did not truly reflect the intention of the parties, and the inclusion of features that were inconsistent with an outright transfer (e.g. the collateral taker's inability to dispose of the collateral freely). See ibid 6.54. In the late 1980s, in the early years of the U.K. repo market, it was unclear whether repos would be characterised as TTCAs or secured loans. See Paul C Harding and Christian A Johnson, *A Practical Guide to Using Repo Master Agreements* (Euromoney Books 2015) 21. However, the introduction of standard agreement documentation in the early 1990s helped participants clarify their intention to create a sale and repurchase agreement and reduce the risk of re-characterisation. See e.g. the Public Securities Association and International Securities Market Association, 'Global Master Repurchase Agreement'. Industry associations in the OTC derivatives industry issued similar standard documents that sought to reduce the risk of re-characterisation of TTCAs. See e.g. International Swaps and Derivatives Association, 'ISDA Credit Support Annex Subject to English Law'. For a more detailed analysis of these and other standard collateral documents in the repo and OTC derivatives industry, see Chapters 2 and 3, respectively.

[42] '[T]he general proposition that when the law is looking for the substance of a matter, it is normally looking for its legal substance, not its economic substance (if different). As Goff LJ put it in *Bank of Tokyo Ltd v Karoon Ltd [1987] AC 45* at p. 64, we are concerned not with economics but with law.' *Re Polly Peck International plc (In Administration) (No 4)* [1996] B.C.C. 486, 495.

relatively more favourable approach of U.S. law to collateral re-use, TTCAs also faced the risk of being re-characterised under U.S. law.

### B. Uncertainty about the recognition and enforcement of TTCAs

During the 1980s and 1990s, a series of court decisions sparked fears of re-characterisation of TTCAs among financial market participants in the U.S. and the E.U. In the U.S., repos, perhaps the most representative example of TTCAs, had been developing on the assumption that the repo buyer (i.e. the collateral taker), as receiver of full title to the securities collateral, would be able to re-use those securities subject only to the obligation to return equivalent securities upon the repo seller's (i.e. the collateral provider's) discharge of her obligation.[43] Similarly, participants assumed that in the event of the collateral provider's insolvency, the collateral taker would be able to realise the collateral and offset her obligation vis-à-vis the collateral provider.[44]

On 16 September 1982, the U.S. Bankruptcy Court for the Southern District of New York in the case of Lombard-Wall, Inc., a small government securities dealer active in the repo market, shattered those assumptions. The court announced that it would characterise repos as secured loans and would subject them to an automatic stay.[45] Effectively, this decision prevented repo buyers from realising the collateral to satisfy their claims without court approval.[46] Less than two years after the court's decision in the *Lombard-Wall case*, the court overseeing the bankruptcy of Lion

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[43] See n 6.

[44] See n 7.

[45] See *Lombard-Wall Incorporated v. Columbus Bank & Trust Co. et al. (In re Lombard-Wall Incorporated)*, No. 82 B 11556, Bankr. Ct., S.D.N.Y., bench decision, September 16, 1982, cited in Senate Report page 47.

[46] See Osenton (n 2) 680; 'U.S. Senate Report to Accompany S. 445' (n 8) 47.

Capital, another failed dealer, also re-characterised repos as secured loans and subjected repo creditors to an automatic stay.[47]

In the U.K., although English law recognised the validity of TTCAs, the industry was concerned with the possibility of TTCAs used to collateralise cross-border transactions being struck down by foreign courts, particularly within the E.U. [48] In October 1996, those fears crystallised when an outright transfer of collateral was successfully challenged under Belgian law before the Belgian Supreme Court.[49] At the time, a large proportion of securities being transferred in Europe, including those that were posted as collateral under TTCAs subject to English law, were deposited at Euroclear, an international central securities depository incorporated in Belgium. Under English law conflict of laws rules, the formal validity of a SICA or a TTCA would be determined by the law of the jurisdiction in which the securities collateral were regarded to be situated, i.e. where the relevant clearing system is operated.[50] As a result, the risk of re-characterization of TTCAs under Belgian law suddenly became a concern for participants across the European markets, including the U.K.

These cases led the financial services industry and the central banks in the U.S. and the E.U. to defend vehemently the need to reduce the legal uncertainty surrounding the enforceability of TTCAs, particularly in the context of insolvency. In the U.S., representatives of the main industry associations, as well as the Fed,

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[47] See Garbade (n 4) 36.

[48] See Benjamin, 'Recharacterisation Risk and Conflict of Laws' (n 12).

[49] See n 16. The *Sart-Tilman case* led to the enactment of the law of 15 July 1998 in Belgium, making it one of the few countries to give broad statutory recognition to transfers of title to collateral. For a more detailed analysis on the legislative reform, see Luigi L De Ghenghi and Bart Servaes, 'Collateral Held in the Euroclear System. A Legal Overview' (1999) 14 Journal of International Banking and Financial Law.

[50] See Benjamin, 'Recharacterisation Risk and Conflict of Laws' (n 12).

testified before Congress to support a regulatory reform.[51] In the E.U., soon after the Belgian Supreme Court decision, many voices, including those of financial industry associations, argued for the need to harmonise national collateral laws across the different Member States within the E.U. [52] In October 1998, the European Commission identified the need to 'enhance legal certainty for the use of collateral on a cross border-basis'[53] as one of its key points in the framework towards the consolidation of a single market for financial services. In May 1999, the EC's Financial Services Action Plan ("FSAP") moved this forward by introducing two specific initiatives to contain systemic risk in securities settlement: [54] the implementation of the Settlement Finality Directive[55] ("SFD") and the promulgation of a new Directive on the cross-border use of collateral.[56]

The industry's fears concentrated on the application of certain general principles of insolvency to financial collateral arrangements; in particular: that creditors having the same priority must be treated equally (i.e. the *pari passu* principle), that asset transfers made during a "suspect" period prior to insolvency

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[51] See n 9.

[52] The harmonisation of the applicable conflict of laws rules raised particularly serious concerns. See e.g. Benjamin, 'Recharacterisation Risk and Conflict of Laws' (n 12). In March 1998, ISDA raised its concerns about the existence of several sources of legal uncertainty in the regulation of collateral for the first time. It called national legislators and supervisory authorities to take action in order to resolve the legal risks posed by collateral use. See ISDA, 'Credit Risk and Regulatory Capital' (1998) 31–32. Later that year, ISDA reiterated some of its concerns with the legal uncertainty affecting collateral agreements in its "Guidelines for Collateral Practitioners". See e.g. ISDA, 'Guidelines for Collateral Practitioners' (1998) 29–32. Some international bodies echoed this call. See e.g. BIS, 'OTC Derivatives: Settlement Procedures and Counterparty Risk Management' (1998) 32–34.

[53] European Commission, 'Financial Services: Building a Framework for Action' (1998) COM (1998) 625 24.

[54] See European Commission, 'Financial Services: Implementing the Framework for Financial Markets: Action Plan' (1999) COM (1999) 232 24 <http://ec.europa.eu/internal_market/finances/docs/actionplan/index/action_en.pdf>.

[55] Directive 98/26/EC of the European Parliament and of the Council of 19 May 1998 on settlement finality in payment and securities settlement systems L166/45.

[56] The FSAP foresaw that a new Directive would be needed to extend the scope of the Settlement Finality Directive to improve the 'legal certainty as regards validity and enforceability of collateral provided to back cross-border securities transactions' beyond payment and settlement systems to bilateral transactions. See European Commission, 'Financial Services Action Plan' (n 54) 8–9, 24.

will be subject to particular scrutiny, that collateral is enforced only in accordance with certain prescribed procedures, and that enforcement may be delayed or prevented.[57]

According to the industry, the application of these general principles could expose parties under a financial collateral arrangement to a series of risks. First, in the U.S., immediately after the Lombard-Wall decision, the financial services industry and the Fed argued that the provision of additional (or "top-up")[58] collateral to cover a change in the parties' exposures could be voided, particularly if effected within a certain period prior to insolvency. [59, 60] In the second half of the 1980s, representatives of the OTC derivatives industry raised similar concerns about the uncertainty surrounding the legal characterisation of swaps in the context of bankruptcy proceedings.[61] In general, insolvency administrators may have the power

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[57] See EFMLG (n 28) 8.

[58] The provision of "top-up" collateral often results from the application of "mark-to-market" processes. Chapters 2 and 3 describe these processes in greater detail in the context of securities financing and OTC derivatives transactions, respectively.

[59] See e.g. the statement of Mr. Strauss, Chairman of the Government and Federal Agency Securities Division, on behalf of the Public Securities Association (PSA) in 'Bankruptcy Reform: Hearing before the Subcommittee on Courts of the Committee on the Judiciary, U.S. Senate, 98th Congress, 1st Session' (n 7) 340.

[60] In particular, §547(b)(4)(A) of the U.S. Bankruptcy Code grants upon the bankruptcy trustee the power to avoid any transfer of an interest of the debtor in property […] made […] on or within 90 days before the date of the filing of the petition[.]' In relation to fraudulent transfers, §548(a) of the Bankruptcy Code provides a preference period of two years.

[61] See e.g. Daniel Cunningham, 'Swaps: Codes, Problems and Regulation' (1986) 5 International Financial Law Review 26. In the case of OTC derivatives, the industry's concerns went beyond the treatment of collateralised swaps in insolvency. Another important concern was the possibility of a bankruptcy court declining to recognise all swap transactions between two parties as forming one single master agreement, and thus declining to enforce the close-out netting mechanisms that are typically included therein. See e.g. the joint statement of Mr. Brickell, Chairman of the ISDA, and Mr. Perlstein, Counsel of ISDA, in 'Bankruptcy Treatment of Swap Agreements and Forward Contracts: Hearing before the Subcommittee on Economic and Commercial Law of the Committee on the Judiciary - House of Representatives, 101st Congress, 2nd Session on H.R. 2057 and H.R. 1754' (1990) 27–28. See also the Fed report in ibid 98–99. Because the parties had calculated their collateral requirements on a net basis, the unenforceability of a close-out netting mechanism would lead to the calculation of the parties' exposure to each other on a gross basis, thereby exposing them to unexpected credit risk. See the joint statement of Mr. Brickell, Chairman of the ISDA, and Mr. Perlstein, Counsel of ISDA, in ibid 27–28. Moreover, if all swap transactions were deemed to be individual agreements, a bankruptcy trustee would be able to assume those swap transactions that are favourable to the bankrupt counterparty and reject those that are unfavourable. This practice is often

to avoid transfers of a debtor's assets to its creditors that are effected within a "suspect" period.[62] Those industry representatives argued that if, for example, the transfer of top-up collateral to the collateral taker were to be voided, it could leave part of the collateral taker's claim unsecured, thereby exposing her to unexpected credit risk.[63] In fact, the same argument could have been made in relation to new TTCAs entered into within the "suspect" period: the collateral taker may be forced to return the received collateral to the insolvent estate and be left with an unsecured claim for the fulfilment of the originally secured obligation.

Such avoidance risk would cast doubt on the collateral taker´s receipt of full title over the collateral and her implicit right to re-use it. According to industry representatives, that avoidance risk could thus discourage the collateral taker from re-using collateral during the life of the repo transaction for fear that the collateral may be recalled.[64] It could even discourage market participants from relying on TTCAs at all.[65] As a result, the collateral taker would not be able to dispose of the collateral assets and would have an incentive to raise the cost of capital to the collateral provider. In other words: she would not be willing to pay any "re-use premium".

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referred to as "cherry picking". See the statement of Mr. Brickell, Chairman of the ISDA, in ibid 16. For an early reflection on this topic, see Schuyler K Henderson, 'Termination of Swaps under US Insolvency Laws' (1984) 3 International Financial Law Review 17, 20.

[62] Transfers of collateral between the parties, e.g. margin payments and settlement payments, could be characterised as transfers of the debtor's property for the purposes of §547 of the Bankruptcy Code. In particular, §547(b)(4)(A) grants upon the bankruptcy trustee the power to avoid any transfer of an interest of the debtor in property […] made […] on or within 90 days before the date of the filing of the petition[.]'

[63] In the case of repos, see e.g. the statement of Mr. Strauss, in 'Bankruptcy Reform: Hearing before the Subcommittee on Courts of the Committee on the Judiciary, U.S. Senate, 98th Congress, 1st Session' (n 7) 340. In the case of OTC derivatives, see the statement of Mr. Perlstein, Counsel of ISDA, in 'Bankruptcy Treatment of Swap Agreements and Forward Contracts: Hearing before the Subcommittee on Economic and Commercial Law of the Committee on the Judiciary - House of Representatives, 101st Congress, 2nd Session on H.R. 2057 and H.R. 1754' (n 61) 18.

[64] See the statement of Mr. Strauss in 'Bankruptcy Reform: Hearing before the Subcommittee on Courts of the Committee on the Judiciary, U.S. Senate, 98th Congress, 1st Session' (n 7) 340.

[65] See e.g. the statement of Mr. Strauss in ibid 342–343.

That avoidance risk did not exist under English law.[66] Yet, the risk still existed in cross-border transactions, where a different national law might be applicable. For example, even if a TTCA is subject to English law, a court may need to apply the substantive law of another jurisdiction, particularly in the context of insolvency.[67] Indeed, this was a major concern for E.U. regulators in the context of the FSAP.[68] In addition to top-up collateral, in the E.U., the industry raised similar concerns about the vulnerability of collateral substitutions to the avoidance powers of an insolvency administrator.[69]

Second, representatives of the repo and OTC derivatives markets in the U.S. also feared the risk of a delay in the collateral taker's ability to enforce collateral immediately upon her counterparty's insolvency. For example, if the collateral provider filed for insolvency, the collateral taker may need to comply with prescribed enforcement procedures in order to realise the collateral.[70] Normally, the

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[66] In order to be set aside as preferences, asset transfers must be 'made in favour of a creditor and ha[ve] the effect of putting the creditor in a better position in the insolvency than that in which it would have been but for the disposition.' ISDA, 'UK Country Report' (n 10) 7. An express intention to put the creditor in a better position is also required. According to ISDA, in the case of top-up collateral, no such desire exists: 'the principal motivation for a transfer of "top-up" collateral is to comply with a pre-existing contractual obligation and thereby avoid the possible sanctions for breach'. ibid.

[67] For example, the English rules of private international law may direct the English court to the application of a foreign law. Alternatively, a foreign court, e.g. a court from the state where the insolvent entity is incorporated in, may assume jurisdiction and itself apply foreign law. For a thorough analysis of how rules of conflict of laws might affect re-characterisation, see Benjamin, 'Recharacterisation Risk and Conflict of Laws' (n 12).

[68] See e.g. FCD Proposal, Recitals (4), (8). See ISDA, 'Collateral Arrangements in the European Financial Markets: The Need for Financial Law Reform' (n 11) 9–10. This latter report further identified a similar risk under the application of "zero hour rules", according to which 'formal insolvency proceedings are deemed to commence at the midnight immediately preceding the time that the formal insolvency proceedings were actually initiated (for example, by petition of a creditor or by court order)'. ibid 10.

[69] Under the law of certain E.U. Member States, if the collateral provider were to substitute posted collateral with other assets of the same economic value, that substitution could change the nature of the existing pledge. Such a change could lead to the need to repeat any prescribed formalities. See EFMLG (n 28) 8. See also the discussion in the previous sub-section about specific formalities applicable to SICAs under U.K. law.

[70] See Paul A Volcker, 'Letter of Paul Volcker, Chairman of the Federal Reserve Board, to Senator Robert J. Dole on 13 December 1982' (13 December 1982) 347.

collateral taker will seek to realise the collateral as soon as possible after its counterparty has filed for insolvency to minimise the market risk, i.e. the risk that the market price of the collateral will move away from the value agreed by the parties in the contract. Complying with such prescribed enforcement procedures may delay the ability of the collateral taker to realise the collateral and, thus, expose the collateral taker to unexpected credit risk if the market price of the collateral were to decline.[71] The same risk could arise if the collateral taker were barred from realising the collateral at all; for example, as a result of the application of an automatic stay.[72] The longer she had to wait to realise the collateral, the greater the possibility that the market value of the securities collateral could drop and, as a result, the less of her claim she would be able to satisfy against that collateral.[73]

In both cases, the industry and the Fed argued that, in order to avert the unexpected credit risk, the collateral taker may resort to other, more expensive, financial instruments, e.g. bank loans.[74] In order to compensate for this expensive finance and for a larger exposure to credit risk, the collateral taker would raise the

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[71] See e.g. Paul A Volcker, 'Letter of Paul Volcker, Chairman of the Federal Reserve Board, to Senator Robert J. Dole on 20 January 1983' (20 January 1983). The letter is reproduced in 'Bankruptcy Reform: Hearing before the Subcommittee on Courts of the Committee on the Judiciary, U.S. Senate, 98th Congress, 1st Session' (n 7) 305.

[72] See U.S. Bankruptcy Code, s 362(a).

[73] According to Paul Volcker, Chairman of the Fed at the time, the re-characterisation of repos and the application of the automatic stay provisions would subject the collateral taker under a repo to 'the unexpected inability to liquidate [collateral] and to the risk of capital loss should unfavourable interest rate changes occur'. Volcker (n 70). The letter is reproduced in 'Bankruptcy Reform: Hearing before the Subcommittee on Courts of the Committee on the Judiciary, U.S. Senate, 98th Congress, 1st Session' (n 7) 346–349. In relation to OTC derivatives, see the statement of Mr. Brickell, Chairman of the ISDA, in 'Bankruptcy Treatment of Swap Agreements and Forward Contracts: Hearing before the Subcommittee on Economic and Commercial Law of the Committee on the Judiciary - House of Representatives, 101st Congress, 2nd Session on H.R. 2057 and H.R. 1754' (n 61) 16.

[74] See 'Bankruptcy Reform: Hearing before the Subcommittee on Courts of the Committee on the Judiciary, U.S. Senate, 98th Congress, 1st Session' (n 7) 343. As I described in Chapter 1, secured financing instruments such as repos will normally bear a lower cost of capital than unsecured financing instruments, e.g. inter-bank loans. I referred to this difference in the cost of capital between secured and unsecured instruments as the "collateral premium".

cost of capital for her counterparties, akin to her reaction to avoidance risk.[75] In other words, she would not be willing to pay a high "collateral premium". The avoidance risk and the stay risk, the industry argued, would lead to an inefficient result: both the collateral taker and the collateral provider would be worse off than in a situation where the former would have been allowed to dispose freely of the collateral.[76]

In the E.U., the industry raised similar concerns in the context of the FSAP. In a series of reports, the Giovannini Group and ISDA defended vehemently the need to reform several aspects of national collateral laws to enhance the legal certainty of collateral in cross-border transactions.[77] They identified several 'legal impediments to the efficient use of collateral', including i) the lack of recognition and enforceability of TTCAs,[78] and ii) the risk of collateral transfers being void under the

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[75] See ibid 314–315. Apparently, in reaction to these drawbacks, many participants chose to curtail their activities in the repo markets or to withdraw from them altogether. See ibid 306, 342–343. In the context of OTC derivatives, see the statement of Mr. Brickell, Chairman of the ISDA, in 'Bankruptcy Treatment of Swap Agreements and Forward Contracts: Hearing before the Subcommittee on Economic and Commercial Law of the Committee on the Judiciary - House of Representatives, 101st Congress, 2nd Session on H.R. 2057 and H.R. 1754' (n 61) 16.

[76] See 'Bankruptcy Reform: Hearing before the Subcommittee on Courts of the Committee on the Judiciary, U.S. Senate, 98th Congress, 1st Session' (n 7) 314–315. This definition of efficiency falls under the Pareto efficiency criterion.

[77] On 26 October 1999, the Giovannini Group issued a report entitled "The EU Repo Markets: Opportunities for Change". See European Commission, 'Commission Welcomes Report Calling for More Integrated EU Repo Markets' (1999) Press Release IP/99/794 <http://europa.eu/rapid/press-release_IP-99-794_en.htm>. Earlier that year, in March 1999, the ISDA Collateral Law Reform Group had presented a paper before the Giovannini Group entitled "Collateral Arrangements in the European Financial Markets: The Need for Law Reform". It can be found at the end of the document reporting on the First Meeting of the Forum Group on the Cross-Border Use of Collateral responsible for the discussion and preparation of a Proposal for the new Directive. See Forum Group of the Cross-Border Use of Collateral, 'Issues Paper for the First Meeting of the Group' (1999) 8–13. In 2000, ISDA published a report that expanded the analysis of its 1999 paper by putting the legal impediments identified therein into the context of specific EU jurisdictions. See ISDA, 'Collateral Arrangements in the European Financial Markets: The Need for Financial Law Reform' (n 11). The 2000 Report was accompanied by a collection of country reports that specified the specific impediments that thwarted the efficiency of the use of collateral in the jurisdiction of each EU Member State. All of them are available from the website of ISDA's Financial Law Reform Committee: http://www.isda.org/c_and_a/collateral-Financial.html. For another industry report in defence of the need to remove legal barriers to facilitate the collateralisation of cross-border transactions in the EU, see EFMLG (n 28).

[78] The problem of re-characterisation was particularly acute in civil law jurisdictions. See Benjamin, 'Recharacterisation Risk and Conflict of Laws' (n 12) 11. In England, courts regard the credit risk taken by the collateral provider vis-à-vis the collateral taker as a genuine difference between a TTCA and a SICA, regardless of them sharing a similar economic purpose. See n 42. On the contrary,

application of certain insolvency law provisions.[79] The European Financial Markets Lawyers Group (EFMLG), a group of senior legal experts from the E.U. banking sector,[80] also expressed their concerns with a stay risk.[81]

In addition, the Giovannini and ISDA reports expressed the industry's concern with the vulnerability of TTCAs 'if there are restrictions on insolvency set-off in the collateral provider's home jurisdiction or if the relevant netting legislation in that jurisdiction is not broad enough to encompass [TTCA]'.[82] Under a TTCA, the collateral taker's obligation to return equivalent assets is given a monetary value that is then set off against the debt owed to the collateral provider. Therefore, the industry regarded the existence of such a right of set-off as "essential" for the effectiveness of TTCAs, particularly in the event of the collateral provider's insolvency.[83] These legal obstacles, they argued, would 'create uncertainty and unpredictability […], leading to inefficiency, cost and increased risk for the financial markets.'[84]

The industry in the U.S. and the E.U. also expressed their concerns with the impact of the re-characterisation of TTCAs on market liquidity. This concern was particularly acute in relation to repos. In the U.S., for example, the industry argued

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'[o]ther jurisdictions lay more emphasis on the intended purpose and would therefore recharacterise (presumably for policy reasons) notwithstanding the substantive difference between the approaches.' ISDA, 'Collateral Arrangements in the European Financial Markets: The Need for Financial Law Reform' (n 11) 8.

[79] See ISDA, 'Collateral Arrangements in the European Financial Markets: The Need for Financial Law Reform' (n 11) 3–10.

[80] The EFMLG is dedicated 'to making analysis and undertaking initiatives intended to foster the harmonisation of laws and market practices and facilitate the integration of financial markets in Europe.' EFMLG, 'EFMLG' <http://ec.europa.eu/internal_market/finances/docs/actionplan/index/action_en.pdf>. Its members are selected 'amongst lawyers of major credit institutions based in the EU active in the European financial markets'. ibid. The Group is hosted by the Legal Services of the ECB. See ibid.

[81] See EFMLG (n 28) 9.

[82] ISDA (n 7) 8.

[83] See European Financial Market Lawyers Group (n 11) 11.

[84] Forum Group of the Cross-Border Use of Collateral (n 77) 8. The ECB also supported this view in an Opinion that was issued on 13 June 2001 at the request of the Council of the European Union concerning the FCD Proposal. See ECB, 'ECB Opinion on the FCD Proposal' (n 27) 6.

that, as a result of the inefficiencies that would arise from the re-characterisation of TTCAs, the appeal of repo markets would be eroded, thus undermining liquidity.[85] The implicit right to re-use collateral under repo and securities lending transactions allows dealer banks to perform market-making functions.[86] Thus, less attractive repo markets could have adverse consequences on the liquidity of markets for securities used as repo collateral.[87] In addition, such inefficiencies would hinder the ability of repo markets to lend large supplies of liquid balances on a daily basis and would thus prevent potential increases in the supply of credit to the overall economy.[88] As we saw in the previous sub-section, in the E.U., the industry had raised a similar concern in relation to the right to re-use collateral under a SICA.

The industry presented one final argument to support the need to improve the legal certainty of TTCAs: the application of automatic stay and avoidance provisions might lead to systemic risks. In the U.S., the industry argued that if a large dealer were to become insolvent, it would create 'a serious risk of market gridlock and other ripple effects that might seriously paralyze [the national] securities and commodities markets'.[89] Moreover, legal inefficiencies might affect the ability of the

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[85] See the testimony of Mr. Strauss on behalf of the Public Securities Association, an association that represented securities firms and banks active in bond markets, before the U.S. Congress, in 'Bankruptcy Reform: Hearing before the Subcommittee on Courts of the Committee on the Judiciary, U.S. Senate, 98th Congress, 1st Session' (n 7) 310, 339.

[86] For example, they use repos to source securities that they can then re-use to transfer to their institutional clients. For a more detailed analysis of repos and securities loans and the role of collateral re-use in them, see Chapter 2.

[87] See the testimony of Mr. Strauss cited in n 85.

[88] See 'Bankruptcy Reform: Hearing before the Subcommittee on Courts of the Committee on the Judiciary, U.S. Senate, 98th Congress, 1st Session' (n 7) 339. Interestingly, this quest for efficiency in the management of investment securities seems to have been driving the major advances in securities trading for decades. For example, some commentators have referred to the indirect holding system as a major evolution from a direct holding system arguing that, 'while in transit to the transferee, the securities were not available for use or investment, causing what has been referred to as "pipeline liquidity (or illiquidity) risk".' Potok (n 113) 2.1 (footnotes omitted) (emphasis added).

[89] 'Bankruptcy Reform: Hearing before the Subcommittee on Courts of the Committee on the Judiciary, U.S. Senate, 98th Congress, 1st Session' (n 7) 308. If a dealer went bankrupt with billions of outstanding obligations to investors and dealers and these entities were subject to an automatic stay,

Fed to use repos to conduct its monetary policy.[90] The use of outright sale transactions instead of repos to conduct monetary policy would introduce greater volatility in interest rates and would lead to higher interest rates.[91] In the E.U., the industry and the ECB raised similar concerns.[92] The industry in the U.S. added that the said inefficiencies and ripple effects could also have negative consequences for the U.S. government and regulatory authorities. For example, primary dealers, who underwrite U.S. government securities, rely heavily on repos and their ability to re-use collateral to fulfil their role as intermediaries.[93] An increase in the cost of capital for primary dealers would translate into an increase in the cost of capital for the U.S. Treasury.[94]

In summary, the financial services industry and the relevant central banks wielded a narrative to convince regulators to reduce legal uncertainty surrounding the recognition and enforceability of TTCAs that relied on an apparently simple

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they would be under considerable pressure to find liquid assets to meet their commitments with their respective counterparties. They would have to borrow funds to meet those commitments or else default on their obligations. See Volcker (n 70). In relation to OTC derivatives, see the Statements of Senator Heflin and Mr. Brickell in 'Interest Swaps: Hearing before the Subcommittee on Courts and Administrative Practice of the Committee on the Judiciary, U.S. Senate, 101st Congress, First Session on S. 396' (1989) 1, 25–26.

[90] For example, the Fed uses repos to drain or inject reserves temporarily into the banking system. See 'Bankruptcy Reform: Hearing before the Subcommittee on Courts of the Committee on the Judiciary, U.S. Senate, 98th Congress, 1st Session' (n 7) 339. The Fed 'also uses repos to invest the funds of 140 foreign central banks for which it provides a variety of banking services.' ibid.

[91] See 'Bankruptcy Reform: Hearing before the Subcommittee on Courts of the Committee on the Judiciary, U.S. Senate, 98th Congress, 1st Session' (n 7) 307. In the words of Mr. Sternlight: 'Federal Reserve open market operations would be impaired by an inefficient repurchase market and our ability to maintain an appropriate level of bank reserves from week to week would be diminished.' ibid 311. Moreover, an inefficient repo market in U.S. Government Securities could undermine the attractiveness of the U.S. dollar as an international reserve currency. See ibid 332.

[92] In relation to ripple effects, see e.g. EFMLG (n 28) 5. In relation to the impact of re-characterisation on the single monetary policy of the Eurosystem, see ECB, 'ECB Opinion on the FCD Proposal' (n 27) 5, 6.

[93] For example, primary dealers will purchase securities from the Federal Reserve Bank of New York ("FRBNY") and re-sell them to institutional investors under another repo, using the cash received under the latter transaction to settle the former purchase.

[94] See 'Bankruptcy Reform: Hearing before the Subcommittee on Courts of the Committee on the Judiciary, U.S. Senate, 98th Congress, 1st Session' (n 7) 343. The inability of primary dealers to underwrite U.S. government securities could also lead to a fundamental change in the structure of the government securities market. See ibid 344.

rationale: protecting the recognition and enforceability of TTCAs would protect the collateral taker's right to dispose of collateral securities as she thought fit, even in the event of the collateral provider´s insolvency. This would allow the collateral taker to reduce the cost of capital for the collateral provider. The protection of TTCAs would also enhance market liquidity by supporting the role of repos in market making activities, and reduce systemic risk by preventing the potential ripple effects that could ensue the demise of large market participant.

## III. Regulatory response

The response of policy makers to these concerns was swift. In the U.S., Congress adopted a reform of the Bankruptcy Code that aimed to reduce the uncertainty surrounding the legal characterization of repos less than two years after the Lombard Wall case: the 1984 Bankruptcy Amendments and Federal Judgeship Act (BAFJA).[95] With the BAFJA, Congress provided repo markets the same protection it had provided securities and commodities markets in 1982.[96] After the enactment of the BAFJA, representatives of the OTC derivatives industry raised similar concerns to those identified by the repo industry and argued that OTC derivatives should receive similar bankruptcy protection.[97] In 1990, the U.S. Congress acknowledged the industry's concerns[98] and passed the "1990 Swaps Amendment Act"[99] to grant OTC derivatives a similar protection than it had provided repos under the BAFJA.[100]

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[95] Public Law 98-353—July 10, 1984 [H.R. 5174] 98 Stat. 333 (hereinafter, "BAFJA").

[96] See 'U.S. Senate Report to Accompany S. 445' (n 8) 48.

[97] See e.g. Cunningham (n 61) 33–34.

[98] Congress acknowledged those concerns to be a threat to systemic stability. See U.S. House of Representatives, 'Bankruptcy: Swap Agreements and Forward Contracts' (1990) House Report No. 101-484, 101st Congress, 2nd Session 2. This House Report is reprinted in 1990 U.S. Code Congressional and Administrative News 223-230.

In the E.U., the rapid implementation of the FSAP became a matter of "utmost importance".[101] In March 2001, less than two years after the launch of the FSAP, the European Commission developed a Proposal for a Financial Collateral Directive (the "FCD Proposal").[102] The definitive Financial Collateral Directive ("FCD")[103] was adopted on 6 June 2002 and was transposed into the national laws of the different Member States progressively. In the U.K., the FCD was implemented by the Financial Collateral Arrangements (No.2) Regulations 2003 (no. 3226) ("FCAR").[104]

As I described in Section II.A, the recognition and enforcement of a right to re-use under SICAs in U.S. law faced little uncertainty. In the U.K. and other E.U. jurisdictions, however, uncertainty was more acute. With the intention to palliate this problem, article 5 of the FCD introduced an express recognition of the collateral taker's right to re-use under a SICA. The influence of the industry's concerns with inefficiency and the erosion of market liquidity were evident on the final text. For example, the Preamble of the FCD affirmed that a Community regime for the provision of collateral under SICAs and TTCAs, including repos, 'will contribute to

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[99] Public Law 101-311 – June 25, 1990 [H.R. 4612] 104 STAT. 267 (hereinafter, the "1990 Swaps Amendment Act").

[100] See e.g. U.S. House of Representatives (n 98) 223–224.

[101] The Stockholm European Council of 23-24 March 2001 urged all parties concerned to speed up the legislative process to implement key steps for achieving an integrated securities market by the end of 2003. See Stockholm European Council, 'Presidency Conclusions and Annexes' paras 18–19 <http://aei.pitt.edu/43341/> accessed 22 July 2015.

[102] Proposal for a Directive of the European Parliament and of the Council on financial collateral arrangements, submitted by the Commission on 27 March 2001, COM(2001) 168 final.

[103] Directive 2002/47/CE of the European Parliament and of the Council of 6 June 2002 on financial collateral arrangements ("FCD") [2002] OJ L 168/43.

[104] The FCAR was laid before Parliament on 10th December 2003 and entered into force on the following day. The FCAR was later amended by the Financial Markets and Insolvency (Settlement Finality and Financial Collateral Arrangements) (Amendment) Regulations 2010 (SI 2010/2993) ("FMIR"), laid before Parliament on 6th December 2010, which entered into force on 6th April 2011. The FMIR implemented the Directive 2009/44/EC of the European Parliament and the Council of 6 May 2009 [2009] OJ L 146/37, which itself amended the SFD and the FCD.

the integration and *cost-efficiency* of the financial market'.[105] Moreover, its Recital 19 affirmed: 'This Directive provides for a right of use in case of security financial collateral arrangements, *which increases liquidity* in the financial market stemming from such reuse of 'pledged' securities.'[106]

The uncertainty surrounding the legal characterisation of TTCAs was a cause for concern in both the U.S. and the U.K. Regulators in both jurisdictions relied on similar mechanisms to address this problem; mainly, express exemptions from those provisions of insolvency law that had been signalled by the industry as potentially problematic. These express exemptions are often referred to as "safe harbour" provisions".

In the U.S., the BAFJA introduced new definitions of "repo participant" and "repurchase agreement" under Section 101.[107] It also amended a series of provisions to protect the enforceability of repos in the bankruptcy context. In particular, it amended Section 362 to allow a repo participant to set off a claim for margin or a settlement payment arising from a repurchase agreement against the former's obligations to the debtor, effectively exempting repos from the automatic stay of claims.[108] Moreover, it amended Sections 546 and 548 to prevent the bankruptcy trustee from avoiding a transfer made by a repo participant to meet a margin or settlement payment under a repurchase agreement.[109] Finally, it added a new section under Chapter 5 of Title 11 to protect the enforceability of *ipso facto* clauses included in repurchase agreements that give the non-defaulting party the right to

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[105] FCD, Recital (3) (emphasis added).

[106] Emphasis added.

[107] See BAFJA, s 391.

[108] See BAFJA, s 392(b), which inserts §362(b)(7) in the Bankruptcy Code. This section is parallel to the existing §362(b)(6) in the Bankruptcy Code.

[109] See BAFJA, ss 393, 394. The content of these sections is parallel to that of the existing §§546(d) and 548(d)(2)(B) of the Bankruptcy Code.

terminate all outstanding transactions upon her counterparty's filing for insolvency.[110]

The 1990 Swaps Amendment Act exempted "swap agreements"[111] from the application of an automatic stay,[112] the avoidance powers of the bankruptcy trustee,[113] and the latter's power to assume or reject swap transactions.[114, 115] As in the case of repos, the exemptions from an automatic stay and the avoidance powers of the bankruptcy trustee assured swap market participants that any collateral received and re-used before a counterparty's filing for bankruptcy would not be recalled.

Like in the U.S., the industry's concerns with the legal characterisation of TTCAs permeated regulation in the E.U. Besides improving cost-efficiency and liquidity, the FCD further regarded a Community regime for financial collateral arrangements as a '[contribution] to the *stability* of the financial system in the Community'.[116] The FCD also aimed 'to improve the legal certainty of financial

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[110] See BAFJA, s 396, which inserts "Section 559. Contractual right to liquidate a repurchase agreement." This section is parallel to the one the existing Code §555 in the Bankruptcy Code.

[111] Section 101 of the 1990 Swaps Amendment Act amended §101 of the Bankruptcy Code to add definitions of "swap agreement" and "swap participant".

[112] Section 102 of the 1990 Swaps Amendment Act amended §362(b) of the Bankruptcy Code by adding a new paragraph 14 to exempt a setoff pursuant to a swap agreement from automatic stay. 'The new paragraph 14 also permits the swap participant to use any collateral previously pledged by the debtor to guarantee, secure or settle any swap agreement.' U.S. House of Representatives (n 98) 5.

[113] Section 103 of the 1990 Swaps Amendment Act amended §546 of the Bankruptcy Code by adding a new subsection g that prevented the a bankruptcy trustee from avoiding a transfer under a swap agreement entered into before the bankruptcy petition was filed, unless there was an actual intent to hinder, delay or defraud any creditor of the debtor. Section 105 also created an exemption under §553(b)(1) of the Bankruptcy Code to avoid the trustee readjusting any setoff involving the debtor which occurred on or within 90 days from the bankruptcy petition was filed.

[114] Section 106 of the 1990 Swaps Amendment Act introduced a new §560 under the Bankruptcy Code to make clear that a swap participant may exercise nay contractual rights to terminate and net out a swap agreement in the event of her counterparty's filing for insolvency.

[115] For a thorough analysis of the problems that the Bankruptcy Code posed for swap market participants and how the regulatory reform addressed them, see Scot Tucker, 'Interest Rate Swaps and the 1990 Amendments to the United States Bankruptcy Code: A Measure of Certainty within Swap Market Contracts' (1991) 1991 Utah Law Review 581.

[116] FCD, Recital (3).

collateral arrangements' by introducing several safe harbour provisions.[117] In this sense, article 4, for example, protects the recognition and enforceability of SICAs and TTCAs against the risk of a delayed enforcement: Member States shall ensure that the collateral taker under a SICA will be able to realise any securities collateral upon the occurrence of an enforcement event 'by sale or appropriation and by setting off their value against, or applying their value in discharge of, the relevant financial obligations',[118] and without any formal requirement.[119] Article 4 further specifies that the commencement or continuation of insolvency proceedings must not impede financial collateral arrangements from being enforced in accordance with their terms.[120] Moreover, article 8 of the FCD protects financial collateral arrangements from the avoidance powers of courts and insolvency trustees, with a specific reference to transfers of "top-up" collateral and substitution of collateral.[121]

Although regulators in the U.S. and the E.U. resorted to similar regulatory mechanisms, i.e. safe harbour provisions, they adopted somewhat different approaches to the problem of the characterization of TTCAs. E.U. regulators sought to clarify the legal characterization of TTCAs by requiring Member States to ensure the express recognition of TTCAs and their enforceability 'in accordance with [their]

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[117] FCD, Recital (5).

[118] FCD, art 4(1)(a). Appropriation will only be possible if it has been agreed by the parties under the relevant SICA. See FCD, art 4(2). In the U.K., see FCAR, regs 17, 18.

[119] See FCD, art 4(4). In the U.K., see FCAR, regs 8, 17, 18.

[120] See FCD, art 4(5). In the U.K., see FCAR, reg 8.

[121] See FCD, art 8(3). In the U.K., see the definitions of "security interest financial collateral arrangement" and "security interest" under FCAR, reg 3. These rules also protect the return of equivalent collateral to the collateral provider under a SICA. See FCD, arts 5(2), 5(3). In the U.K., see FCAR, regs 16(2), 16(3). In support of this view, see Beale and others (ch 1, n 4) 6.48; Yeowart and Parsons (ch 1, n 62) 11.20. In a recent decision, the Court of Justice of the European Union confirmed that the super priorities that the FC confers on collateral takers are compatible with the *pari passu* principle, i.e. that creditors are to be treated equally in insolvency proceedings. See Case C-156/15 *'Private Equity Insurance Group' SIA v 'Swedbank' AS* [2016], paras 49-54.

terms', [122] as well as the enforceability of close-out netting mechanisms in insolvency.[123] In contrast, U.S. regulators avoided a direct solution: they introduced *ad hoc* exemptions for specific financial products; namely, certain repos and swaps transactions.[124] In other words: in the U.S., safe harbour provisions would apply to "repurchase agreements" as defined in the Bankruptcy Code regardless of their legal characterisation.[125]

In the U.S., this piecemeal approach led to a long process of iterative reforms of the Bankruptcy Code that sought to expand the scope of the relevant safe harbour provisions as repo and OTC derivatives markets continued to evolve.[126] These

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[122] FCD, art 5(1).

[123] See FCD, art 7. In the U.K., see FCAR, regs 10(1)(b), 12.

[124] The legal characterisation of repos under U.S. law was a thorny problem. The re-characterisation of TTCAs such as repos as secured loans in a bankruptcy proceeding could have important consequences. As evidenced by the Lombard-Wall case, such re-characterisation would result in the application of automatic stay and avoidance provisions. Moreover, if characterised as secured loans, repos would have to comply with certain formalities for attachment and perfection as required under Article 9 of the UCC. In the absence of these formalities, the collateral taker's rights over the collateral could not be enforced against the bankruptcy trustee. See Jeanne L Schroeder, 'Repo Madness: The Characterization of Repurchase Agreements under the Bankruptcy Code and the U.C.C.' (1995) 46 Syracuse Law Review 999, 1008. However, characterising repos as sale and repurchase transactions had its own disadvantages. First, they would be classified as executory contracts for the purposes of bankruptcy law and the bankruptcy trustee would have the right to assume or reject them pursuant to §365 of the Bankruptcy Code. This would give the trustee the opportunity to speculate with the value of the collateral at the expense of the collateral taker. See Osenton (n 2) 682. Moreover, the collateral taker would only be able to dispose of the collateral if the bankruptcy trustee decided to reject the transaction. Second, if the collateral taker were to dispose of the collateral upon liquidation, she could be liable for contract damages. See ibid 683.

[125] See 'Bankruptcy Reform: Hearing before the Subcommittee on Courts of the Committee on the Judiciary, U.S. Senate, 98th Congress, 1st Session' (n 7) 347, 348.

[126] For example, in a series of reports, the President's Working Group on Financial Markets ("PWG") proposed Congress a series of amendments to the Bankruptcy Code that sought to expand the existing exemptions to a series of new financial products, e.g. credit derivatives. See Michael Krimminger, 'The Evolution of U.S. Insolvency Law for Financial Market Contracts' (Social Science Research Network 2006) SSRN Scholarly Paper ID 916345 14 <http://papers.ssrn.com/abstract=916345> accessed 20 July 2015. In addition, the definition of repos under the BAFJA did not cover all repos. These and other products were introduced under the scope of the safe harbour provisions in the Bankruptcy Abuse Prevention and Consumer Protection Act (BAPCPA). Pub.L. 109-8, 119 Stat. 23, enacted April 20, 2005. In part, this piecemeal approach was also motivated by the fragmented scope of U.S. financial supervision. The exemptions contained in the Bankruptcy Code did not apply to important market participants such as banks, broker-dealers and other financial institutions, which fell under the scope of Federal banking laws. See e.g. Federal Reserve Staff Responses to Questions Posed by Congressman Schumer Regarding Swap Agreements in 'Interest Swaps: Hearing before the Subcommittee on Courts and Administrative Practice of the Committee on the Judiciary, U.S. Senate, 101st Congress, First Session on S. 396' (n 89) 48. The Financial Institutions Reform, Recovery and

subsequent pieces of new legislation culminated several decades of legislative reform that aimed to protect market stability 'in a more coherent, expanded, and adaptable way'.[127]

## IV. Limits of the regulatory rationales

As I described in the previous Sections, regulators in the U.S. embraced the concerns that the industry had raised in relation to the legal uncertainty that affected the recognition and enforcement of TTCAS, which, consequently, hindered the implicit right of the collateral taker to re-use collateral. In the E.U., regulators also addressed the industry's concerns with the obstacles that hampered the express right to re-use under SICAs. Arguably, the main concern of regulators in the U.S. and the E.U. was inefficiency. The industry regarded the legal impediments to re-use collateral under SICAs, and the application of automatic stay and avoidance provisions, as obstacles that prevented the collateral taker from increasing the functionality of collateral by disposing of it as she thought fit, and the collateral provider from capturing a reduction in the cost of capital.[128] In other words, as obstacles to the full economic potential of collateral.

This notion of efficiency falls under the Pareto criterion of efficiency. Under the Pareto criterion, a Pareto *improvement* is an allocation of resources that increases the welfare of at least one party without reducing the welfare of any other party.[129]

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Enforcement Act (FIRREA), enacted in 1989, brought federal banking law in line with bankruptcy law by extending to certain Qualified Financial Contracts (QFCs) similar exemptions to those provided under the Bankruptcy Code. See Krimminger 8. The enactment of the Federal Deposit Insurance Corporation Improvement Act (FDICIA) in 1991 introduced additional protections for netting than those provided under the Federal Deposit Insurance Act and the Bankruptcy Code.

[127] Krimminger (n 126) 20.

[128] See n 26.

[129] See Parisi (Introduction, n 2) 215, 319.

An allocation is said to be Pareto efficient where Pareto improvements are no longer possible.[130] In this sense, the ability of the collateral taker to re-use collateral would be a Pareto improvement from a situation where no such re-use is permitted: the collateral taker will be able to dispose of the collateral as she thinks fit, thus increasing its functionality, and the collateral taker would compensate the collateral provider for that increased functionality by paying a re-use premium.

The First Welfare Theorem ("FWT") establishes two conditions under which market equilibria will be Pareto efficient: 1) that markets are competitive; and 2) that markets are complete.[131] That markets are competitive may be understood as a condition that all participants in the market are price takers, i.e. that none of them has enough power to dictate the price of a certain good: only the interaction of supply and demand forces will determine what that price should be.[132] Markets are said to be "complete" when there is a market for every combination of risk and return, and therefore a market price for it.[133]

When markets depart from any of these conditions, market equilibria will not lead to a Pareto efficient outcome.[134] These situations are often known as "market failures".[135] The FWT establishes perfectly competitive markets as a 'benchmark for thinking about outcomes in market economies.'[136] As such, it can inform any market intervention: '[I]n particular, any inefficiencies that arise in a market economy, and

[130] See ibid.

[131] See Andreu Mas-Colell, *Microeconomic Theory* (Oxford University Press 1995) 327.

[132] See ibid 314.

[133] See ibid 327.

[134] See ibid 350.

[135] See ibid.

[136] ibid 308.

hence any role for Pareto-improving market intervention, *must* be traceable to a violation of at least one of the assumptions of [the FWT].'[137]

Externalities are an example of how markets may not satisfy one of the conditions laid under the FWT: complete markets. An externality is present whenever an agent is directly affected by the action of another agent in the economy,[138] but they lack the contractual or institutional relationships to internalise the positive or negative effects of their behaviour.[139] *For example, externalities* arise in the absence of a market: otherwise, the potentially affected parties will have priced the externality effects and traded them.[140]

Systemic risk can be regarded as an externality. In general, we might regard systemic risks as those that threat to undermine the stability of the financial system.[141] The concept of "financial stability" is, itself, elusive.[142] Yet, financial policy makers have often adopted a conceptual definition that focuses on the capacity

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[137] ibid. (Emphasis in the original.)

[138] See ibid 352.

[139] See James M Buchanan and Wm Craig Stubblebine, 'Externality' (1962) 29 Economica 371. There are two types of externalities: consumption externalities and production externalities. When one agent's *decision to consume* depends on another agent's decision to produce or consume, we are in the presence of a consumption externality. When one agent's *decision to produce* is affected by another agent's decision to produce or consume, we are in the presence of a production externality. Externalities can have a positive or negative effect. See Hal R Varian, *Intermediate Microeconomics : A Modern Approach* (Ninth edition, WWNorton 2014) 663.

[140] See Mas-Colell (n 131) 358–359.

[141] In 2000, De Bandt and Hartmann developed a framework for the economic analysis of systemic risk. See European Central Bank, 'Financial Stability Review' (2009) 9; Bank of England (Introduction, n 4) 1. They updated the framework in 2012. See Olivier De Bandt, Philipp Hartmann and José Luis Peydró, 'Systemic Risk in Banking: An Update' in Allen N Berger, Phillip Molyneux and John OS Wilson (eds), *Oxford Handbook of Banking* (2015). In order to construct a concept of systemic risk, they depart from the more basic concept of "systemic events", which may be characterised as narrow or broad depending on the number of institutions or market suffering the shock. See ibid 636. Narrow (broad) events are further categorised as "strong" or "weak" depending on whether they will lead to the actual failure of one (many) institution(s) or crash(es) of one (many) market(s). See ibid. They then define a systemic risk as that of experiencing systemic events in the strong sense, i.e. as the materialisation of contagion. See ibid. If the impact of such strong systemic events is restricted to the financial sector alone, systemic risk is said to have a "horizontal" dimension; if it has an impact on the real sector (i.e. on output and general welfare), they speak of a "vertical" dimension of systemic risk. See ibid.

[142] For example, the term is ubiquitous in the Dodd-Frank Act. It even describes Title I of the Act. However, nowhere does the Act provide a definition of the term.

of the financial system to continue performing its core functions[143] despite shocks and the unravelling of financial imbalances.[144] For the remainder of the dissertation, I shall therefore refer to systemic risks as those that can undermine the capacity of the financial system to perform its core functions.

In the case of systemic risk, there is a missing insurance market: no market participants would be able to insure against the risk of the whole system collapsing. Even if some market participants had purchased insurance *ex ante*, as the shock spreads and new participants become affected and start to seek for insurance, an increase in the perceived probability of systemic risk materialising would discourage the provision of any insurance protection.[145]

In the context of collateral re-use, the regulatory rationale that led to the reforms described in the previous Section did raise a concern with systemic risk: if a large dealer were to file for insolvency, the application of the automatic stay and avoidance provisions could trigger ripple effects and potentially lead financial markets to a standstill. However, this rationale was incomplete: it only acknowledged the possible implications for systemic risk in one direction, i.e. the implications of continuing to apply the legal regime that was in force at the time; but it did not acknowledge the possible implications that the proposed regulatory reforms could have on the very financial stability they were meant to protect.

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[143] Some of the core functions that financial systems play in the economy include, e.g. 'providing the main mechanism for paying for goods, services and financial assets; intermediating between savers and borrowers, and channelling savings into investment […]; and insuring against and dispersing risk.' Bank of England, 'The Strategy for the Bank's Financial Stability Mission 2013/14' (2013) 1 <http://www.bankofengland.co.uk/about/documents/strategy1314.pdf>.

[144] See e.g. ECB, 'Financial Stability Review' (2009) 9; Bank of England, 'The Strategy for the Bank's Financial Stability Mission 2013/14' (n 143) 1.

[145] This is often called the "Hirshleifer effect": the availability of too much information can reduce the opportunities to share risk. See Bernhard Eckwert and Itzhak Zilcha, 'Incomplete Risk Sharing Arrangements and the Value of Information' (2003) 21 Economic Theory 43, 45.

In the E.U., a few voices raised some concerns.[146] However, they were dismissed in the name of Pareto improvements.[147] In the U.S., the industry and the regulators did not see any similar concerns.[148] In the end, the quest for Pareto efficiency eclipsed other important considerations, and the new reforms to collateral laws crystallised the belief that by promoting efficiency, the new rules would also be reducing systemic risk.[149]

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[146] For example, the Economic and Social Committee (ESC) expressed its concern about the need to take into account the possible implications of the proposed bankruptcy safe harbours for other creditors of the collateral provider, as well as for the collateral provider herself. See ESC, 'Opinion of the Economic and Social Committee on the "Proposal for a Directive of the European Parliament and of the Council on Financial Collateral Arrangements"' (2001) (2002/C 48/01) paras 3.4, 3.5 <http://eur-lex.europa.eu/legal-content/EN/HIS/?uri=CELEX:32002L0047>. In the U.K., the City of London Law Society Financial Law sub-Committee expressed similar concerns in the context of the implementation of the FCAR. See The City of London Law Society Financial Law Sub-Comittee (n 18) 14. They also pointed to some supervisory concerns relating to the re-use of mortgaged securities creating multiple obligations between different parties. See ibid 15.

[147] In the E.U., the FCD finally did not include any provision addressing the concerns raised by the ESC. See Council of the European Union and European Parliament, 'Common Position on the Adoption of a Directive of the European Parliament and of the Council on Financial Collateral Arrangements' (2002) <http://eur-lex.europa.eu/legal-content/EN/HIS/?uri=CELEX:32002L0047>. In the U.K., the City of London Law Society Financial Law sub-Committee underplayed the importance of these concerns on the basis of the efficiency gains resulting form the re-use of collateral: 'Against [these concerns], the right of use will give additional liquidity to the collateral taker, and the availability of the financial collateral may be reflected, at least in the wholesale markets, by more favourable pricing in favour of the collateral provider.' The City of London Law Society Financial Law Sub-Comittee (n 18) 15. Indeed, in the end, the U.K. legislator did not address any of those concerns in the FCAR.

[148] The words of Mr. Sternlight in reference to the proposed reforms to the Bankruptcy Code in the hearing before the U.S. Senate Subcommittee on Courts are quite illustrative: 'Mr. Chairman, if the costs of adopting these changes that are proposed were appreciable, it would be tempting to wait and see whether the more severe effects on the repo market would emerge, but it seems to us a remedy is fairly simple, and we advocate that simple remedy.' 'Bankruptcy Reform: Hearing before the Subcommittee on Courts of the Committee on the Judiciary, U.S. Senate, 98th Congress, 1st Session' (n 7) 307. The U.S Senate agreed with Mr. Sternlight's testimony on the absence of any alternative solution for the legal uncertainty surrounding repos: 'While these concerns are currently being addressed within the mutual fund industry, the only certain solution at this time appears to be the proposed amendments to the Bankruptcy Code[.]' 'U.S. Senate Report to Accompany S. 445' (n 8) 48. Nowhere in the report did the Senate show any concern with the possible effects that these proposed amendments could have on other actors. The House displayed a similar reaction in similar legislative initiatives: 'We estimate that no cost to the federal government or to state or local governments would result from enactment of this bill [introducing bankruptcy safe harbours for swaps and forwards].' U.S. House of Representatives (n 98) 7.

[149] At the end of 2006, the European Commission still believed that '[t]he establishment of the right of use under the [FCD] does not seem to give rise to any problems[.]' European Commission, 'Evaluation Report on the Financial Collateral Arrangements Directive (2002/47/EC)' (2006) COM(2006) 833 final 10. However, the European Commission also affirmed that 'it remain[ed] to be seen what experience the market will have with the use of this right.' ibid.

In essence, this unidirectional approach to systemic risk was an industry plea for regulators to validate the dubious assumptions on which repo and OTC derivatives markets had grown. In the late 1970s and early 1980s, participants in the repo markets disregarded the legal characterization of repos under the Bankruptcy Code 'because [they] may be characterized as one of several types of transactions, for tax law, securities law, and many other purposes.'[150] Although U.S. bankruptcy courts had not positioned themselves about the legal characterization of repos in insolvency, market participants decided to take the risk: repo markets grew on the assumption that certain provisions in the Bankruptcy Code would not prevent the collateral taker from disposing of the collateral as she thought fit.[151] By the time the *Lombard Wall case* and other court decisions had proved that assumption wrong, repo markets had grown too large to ignore.[152] Unsurprisingly, the industry argued that letting the repo market fail would bring about havoc by unleashing potentially devastating ripple effects.[153] After having built a tower on uncertain ground, the industry asked everyone at the bottom to help buttress it unless they wanted to be squashed when it collapsed.[154]

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[150] Mr. Sternlight's statement in 'Bankruptcy Reform: Hearing before the Subcommittee on Courts of the Committee on the Judiciary, U.S. Senate, 98th Congress, 1st Session' (n 7) 308.

[151] See the Statement of Mr. Sternlight in ibid 337. At the beginning, dealers took advantage of the legal uncertainty surrounding the legal characterization of repos by documenting these transactions in whichever way fitted their counterparties needs. As one dealer recalled: 'We left [the characterization of a repo] purposely vague because doing so fit our needs. If a customer said, "I can't do repo," we said, "OK, we will sell you securities and buy them back." If another customer said he could not buy securities, we said, "Fine, we will borrow money from you and give you collateral." It was all very convenient […].' Cited in Garbade (n 4) 30.

[152] Kettering has made a similar argument describing repos as products that were "too-big-to-fail". See Kenneth C Kettering, 'Securitization and Its Discontents: The Dynamics of Financial Product Development' (2007) 29 Cardozo Law Review 1553, 1640–1655.

[153] See n 89.

[154] In the words of Mr. Sternlight: 'If the expectations of favorable legislative action are disappointed, I would expect to see clearer evidence of deterioration of the market.' 'Bankruptcy Reform: Hearing before the Subcommittee on Courts of the Committee on the Judiciary, U.S. Senate, 98th Congress, 1st Session' (n 7) 314.

In recent years, some legal scholars have pointed to the incompleteness of the industry's narrative by arguing that, rather than reducing systemic risk, bankruptcy safe harbours for repos and OTC derivatives could actually increase it.[155] For example, safe harbour provisions effectively give collateral takers a super-priority against other creditors that will reduce the former's incentives to monitor the debtor.[156] This weaker monitoring could lead the borrower to take excessive financial risk.[157] It could also lead to moral hazard problems, as major players will have an incentive to increase their portfolio of financial contracts receiving a preferential treatment and thus become too-big-too-fail (TBTF).[158] Moreover, the exemption from automatic stay and avoidance provisions can allow participants in repo and OTC derivatives markets to run from an ailing debtor by requesting the latter to post additional collateral before it fails.[159] Under the safe harbour provisions, this

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[155] Bliss and Kauffman were among the first to point to the complex relationships between safe harbour provisions and systemic risk: 'the systemic risk reduction claims often made for close-out netting and collateral protection appear at a minimum to have been over stated. Systemic risk is in part made more likely as a result of these protections, but then so also are the benefits obtained from a more efficient market that is based on these same protections. The combined use of these three provisions represents a two-edged sword that cuts both ways.' Bliss and Kaufman (ch 3, n 22) 69. Particularly, for a critique of the fear of systemic risk as a "red herring", see Franklin R Edwards and Edward R Morrison, 'Derivatives and the Bankruptcy Code: Why the Special Treatment?' (2005) 22 Yale Journal on Regulation 91. For a summary of the main costs and benefits of exemptions from automatic stays, see Darrell Duffie and David Skeel, 'A Dialogue on the Costs and Benefits of Automatic Stays for Derivatives and Repurchase Agreements' in Kenneth E Scott and John B Taylor (eds), *Bankruptcy Not Bailout: A Special* (Hoover Press 2013).

[156] See Mark J Roe, 'The Derivatives Markets Payment Priorities As Financial Crisis Accelerator' (2011) 63 Stanford Law Review 539, 552. In relation to U.K. law, see Rizwaan Jameel Mokal, 'Liquidity, Systemic Risk, and the Bankruptcy Treatment of Financial Contracts' (2015) 10 Brooklyn Journal of Corporate, Financial & Commercial Law 15, 49.

[157] For example, Roe argues that this may have led Bear Sterns to rely heavily on short-term debt in the form of repos, which ended up destabilising the firm. See Roe (n 156) 533, 552. He makes a similar argument in relation to Lehman Brother's derivatives positions: 'if the superpriorities had not been in place when Lehman built its capital structure and derivatives portfolio, Lehman's derivatives and repo counterparties' incentives to insist upon a more stable Lehman would have been greater. And Lehman itself would have been incentivized to keep to a safer capital structure to encourage its counterparties to keep dealing with it at low cost.' ibid 554.

[158] See Roe (n 156) 560–562. See also David A Skeel and Thomas H Jackson, 'Transaction Consistency and the New Finance in Bankruptcy' (2012) 112 Columbia Law Review 152, 166–168. In relation to U.K. law, see Mokal (n 156) 89.

[159] In reference to the experience with AIG, see Stephen J Lubben, 'Repeal the Safe Harbors' (2010) 18 American Bankruptcy Institute Law Review 319, 319–320; Roe (n 15) 565–566.

collateral is, effectively, irretrievable.[160] Additionally, counterparties could simply seek an early termination.[161] Indeed, Baird and Morrison have also argued that massive terminations and close-outs affecting one of the few major derivatives dealers could cause major damages to markets.[162]

These criticisms focus on the possible systemic effects of protecting the collateral taker's ability to dispose of collateral assets *after* its counterparty default. Nevertheless, those bankruptcy safe harbours also protect and promote the collateral taker's right to re-use collateral, i.e. the right to dispose of it *before* the collateral provider's insolvency. Yet, the potential effects of collateral re-use on systemic risk remain unexplored. In the next two Chapters, I aim to fill that very gap.

# V. Conclusion

Historically, the collateral taker's ability to re-use collateral has encountered considerable legal obstacles. For example, under the law of numerous E.U. Member States, including the U.K., the collateral taker under a SICA was not permitted to hold a right to re-use collateral as it deemed fit. In addition, during the 1980s and 1990s, there was considerable uncertainty in the U.S. and the E.U. about the recognition and enforceability of TTCAs, particularly in the context of insolvency, which cast doubt on the collateral taker's implicit right to re-use.

In those years, the financial services industry, frequently seconded by the relevant central banks and other financial supervisors, wielded a powerful narrative that permeated regulation: the application of automatic stay and avoidance provisions

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[160] See Lubben (n 159) 320.

[161] See ibid 330.

[162] See Douglas G Baird and Edward R Morrison, 'Dodd-Frank for Bankruptcy Lawyers' (2011) 19 American Bankruptcy Institute Law Review 287, 312–313.

to TTCAs would undermine the ability of the collateral taker to dispose of collateral as she deems fit, thereby leading to inefficiencies and eroding market liquidity, and it would increase systemic risk.[163] Similar arguments were made in relation to the inability of the collateral taker to re-use collateral under a SICA in the jurisdictions of several E.U. Member States.

This narrative was reflected in regulation that aimed to protect the recognition and enforceability of financial collateral arrangements in the U.S. and the E.U. The narrative, however, was incomplete. It only looked for systemic risk implications in one direction: regulatory inaction; but it failed to explore whether the proposed regulatory reforms could, themselves, increase systemic risk. Within the past ten years, legal scholars have identified several ways in which safe harbour provisions could increase systemic risk, mainly in relation to the protection of the collateral taker's right to dispose of collateral immediately after her counterparty's insolvency. Yet, those safe harbour provisions go beyond protecting the right to dispose of collateral *after* insolvency. Even if inadvertently, they also protected the collateral taker's right to dispose of collateral *before* insolvency; i.e., the collateral taker's right to re-use. So did the FCD by expressly recognising the validity and enforcement of an express right to re-use under SICAs. However, the potential implications of collateral re-use on systemic risk remain unexplored in the academic literature.

In the next two Chapters, I will examine how the unfettered re-use of securities collateral can aggravate systemic risk. In Chapter 5, I will describe how collateral chains can serve as channels of contagion in securities financing and OTC

[163] In the words of Alan Greenspan, Chairman of the Fed when the regulatory reforms were being discussed: 'Our overall assessment is that the proposed changes would reduce potential risks to the banking system arising from swap agreements and would increase the efficiency of the marketplace as a whole.' 'Bankruptcy Treatment of Swap Agreements and Forward Contracts: Hearing before the Subcommittee on Economic and Commercial Law of the Committee on the Judiciary - House of Representatives, 101st Congress, 2nd Session on H.R. 2057 and H.R. 1754' (n 58) 93.

derivatives markets. In Chapter 6, I will describe how, under certain circumstances, the conferral of a right to re-use to the collateral taker can instil in collateral providers an incentive to behave in ways that can undermine systemic stability.

# Chapter 5. The Effect of Collateral Re-use on Asset Value Contagion

## I. Introduction

Collateral re-use has been described as the oil that lubricates financial markets.[1] This illustrative assertion speaks to three implications of collateral re-use. Firstly, by granting the collateral taker a right to re-use, the collateral provider will enjoy a lower cost of capital in the form of a "re-use premium" that she receives from the collateral taker. In this sense, collateral re-use can facilitate the access of collateral providers to financial markets.

Secondly, by allowing the collateral taker to dispose of the received collateral assets, the right to re-use provides the collateral taker an alternative source of finance for its own activities. For example, in the absence of such right to re-use, the collateral taker would have had to borrow cash on an unsecured basis, yet at a considerable cost, or else to post her own assets as collateral to bring down the cost of finance. Using her own assets, however, would have an opportunity cost: the collateral taker would not be able to put it to other uses. The right to re-use received collateral allows the collateral taker the best of both worlds: to access finance at a low cost of capital, and to keep her assets at her disposal. In this sense, collateral re-use facilitates the access of collateral takers to financial markets.

[1] See Singh, 'Velocity of Pledged Collateral: Analysis and Implications' (ch 2, n 15).

And thirdly, collateral re-use permits the same asset to collateralise those two financial transactions: the collateral provider's and the collateral taker's. In principle, the same collateral asset could support an infinite number of financial transactions. This seemingly infinite power relies in a legal transformation: the number of proprietary rights in the assets remains unchanged, but the number of contractual claims over the assets increases every time they are re-used. Here, the power of lubrication is probably at its best.

As we saw in the previous Chapter, the regulatory rationale to protect and promote collateral re-use was incomplete: it only explored the potential impact that restricting collateral re-use could have on systemic risk; it did not explore the potential consequences that an unfettered re-use of collateral could have on systemic risk. In the next two Chapters, I intend to fill this gap.

This Chapter will examine the potential effect that collateral re-use can have on the role of asset prices as channels of contagion. Academic commentators have often referred to this phenomenon as "asset value contagion" (AVC).[2] Section II provides a general description of asset value contagion, and Section III briefly presents how asset value contagion may arise in the specific context of SFTs and OTC derivatives markets. Section IV provides a detailed analysis of the third aspect of lubrication described above: the multiplication of the number of claims that will be referenced to the same collateral asset. Section V explores the specific ways in which this multiplication effect of collateral re-use can amplify asset value contagion. It provides an example of an SFT transaction to illustrate the different effects. Section VI provides an additional example of these effects in the context of OTC derivatives. Section VII concludes.

[2] See e.g. Mokal (n 156) 27.

## II. "Asset value contagion" (AVC), or prices as channels of contagion

Before the 2007-08 financial crisis, financial contagion was predominantly understood as a "domino effect" whereby the default of one institution would be spread across the market through direct credit exposures between financial institutions.[3] However, attempts to find empirical evidence of domino effects predominantly suggest that, so far, these effects have been rather small.[4] In other words, domino effects would only cause a credible threat to financial stability if the shock were extraordinarily large.[5]

Indeed, domino effects alone cannot explain the virulence with which stress in relatively small financial markets, such as the subprime mortgage market, spread to other parts of the financial system during the 2007-08 crisis.[6] One probable explanation for such virulence may lie in the role of asset prices as channels of contagion.[7]

Changes in the prices of financial assets can respond to shocks that are external to the financial system, e.g. in response to changes in the supply or demand

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[3] See e.g. Jean-Charles Rochet and Jean Tirole, 'Interbank Lending and Systemic Risk' (1996) 28 Journal of Money, Credit and Banking 733; Franklin Allen and Douglas Gale, 'Financial Contagion' (2000) 108 Journal of Political Economy 1; Xavier Freixas, Bruno M Parigi and Jean-Charles Rochet, 'Systemic Risk, Interbank Relations, and Liquidity Provision by the Central Bank' (2000) 32 Journal of Money, Credit and Banking 611.

[4] See e.g. Adrian, Tobias and Hyun Song Shin, 'Liquidity and Financial Contagion', *Banque de France Financial Stability Review - Special Issue Liquidity* (2008) 2–3.

[5] Adrian and Shin further criticise the stress tests that central Banks used to carry out to analyse potential domino effects because i) these tests do not take into account that market participants are not passive and do react in the event of default, and ii) the models do not take sufficient account of how prices and measured risk change when there is a default. See ibid 3.

[6] See ibid 2–3.

[7] See ibid. 'Indeed, defaults need not even be *necessary* to generate contagion. Price changes themselves may be enough.' ibid 3. For an earlier, more general analysis of the potential role of prices as channels of contagion, see Rodrigo Cifuentes, Gianluigi Ferrucci and Hyun Song Shin, 'Liquidity Risk and Contagion' (2005) 3 Journal of the European Economic Association 556.

of the asset, a listed company's revenue being higher or lower than expected, or simply changes in the social and political circumstances where a given company operates or a specific financial market is rooted. However, changes in the prices of financial assets can also respond to internal dynamics in financial markets. In particular, marking assets to market is an important factor in the development of these internal dynamics.

Marking assets to their market value increases transparency. [8] Such transparency will improve the ability of market participants to assess their counterparty credit risk, and therefore, to take the necessary steps to prevent a counterparty default from impairing their own solvency. However, marking-to-market can also lead to destabilising effects.

Adrian and Shin describe how, when balance sheets are continuously marked-to-market, changes in asset prices will lead to changes in net worth of asset holders.[9] Financial intermediaries will react to those changes in net worth by adjusting the size of their balance sheets. For example, if the price of an asset were to increase, the balance sheet of an intermediary holding that asset would become stronger, thus lowering its leverage ratio. [10] A lower leverage ratio translates into financial intermediaries holding "surplus capital".[11] In order to employ that surplus capital and restore their leverage level, intermediaries will seek to expand their balance sheets: on the liability side, they will typically take on more short-term debt, and on the asset

[8] See Cifuentes, Ferrucci and Shin (n 7) 558.

[9] See Tobias Adrian and Hyun Song Shin, 'Liquidity and Leverage' (2010) 19 Journal of Financial Intermediation 418, 420–424.

[10] This statement will hold under the assumption that any other element in the balance sheet remains unchanged. A firm's leverage can be described as the ratio of total assets to equity. It may be may be expressed with the following formula: Leverage = Assets / (Assets – Debt).

[11] When the price of an asset increases, holding everything else constant, the leverage ratio as expressed in the equation in n 10 declines. 'In analogy with manufacturing firms, we may see the financial system as having "surplus capacity".' Adrian and Shin, 'Liquidity and Leverage' (n 9) 436.

side, they will seek new borrowers to lend to.[12] On the other hand, if the price of an asset were to decline, the leverage ratio of an intermediary holding that asset would rise, thereby reducing its net wealth. An intermediary will normally react to such changes by liquidating assets to pay down its debt, thereby reducing the size of its balance sheet and lowering its leverage ratio.[13] This is often referred to as "deleverage".[14]

According to Adrian and Shin, commercial banks seem to have a neutral approach to leverage; i.e., they try to maintain their leverage levels constant.[15] However, other financial intermediaries such as securities dealers tend to have a procyclical leverage; i.e., they present high leverage levels when asset prices are on the rise and low leverage levels when asset prices decline.[16] Such procyclical leverage is 'a consequence of the active management of balance sheets by financial intermediaries who respond to changes in prices and measured risk.'[17] When

[12] See ibid 420–424.

[13] See ibid.

[14] Adrian and Shin have used this term in a similar fashion in other works. Yet, they refer to deleveraging as a collective action from different financial intermediaries, who proceed to reduce their balance sheets almost simultaneously. See e.g. Tobias Adrian and Hyun Song Shin, 'Financial Intermediary Leverage and Value-at-Risk' (2008) Federal Reserve Bank of New York Staff Report no. 338 1. However, for the purpose of this exposition, I shall refer to these situations as "collective deleveraging" to differentiate them from cases where only one institution seeks to reduce the size of its balance sheet. Deleveraging should not be confused with the reduced access to credit that can result from the decline in prices of assets that a firm may use as collateral. For an analysis of these "collateral squeezes", see Nobuhiro Kiyotaki and John Moore, 'Credit Cycles' (1997) 105 Journal of Political Economy 211.

[15] See Adrian and Shin, 'Liquidity and Leverage' (n 9) 420–422.

[16] See ibid 421–422. Their internal risk management rules and their creditor's inability to impose leverage limits that reflect the changing risk environment may explain this procyclical effect. See Tobias Adrian and Hyun Song Shin, 'Procyclical Leverage and Value-at-Risk' (2014) 27 Review of Financial Studies 373, 373–375. Coval and Stafford find evidence that capital flows in open-ended investment funds present a similar procyclical pattern which may affect the prices of assets in which they invest. See Joshua Coval and Erik Stafford, 'Asset Fire Sales (and Purchases) in Equity Markets' (2007) 86 Journal of Financial Economics 479, 481–482.

[17] Adrian and Shin, 'Liquidity and Leverage' (n 9) 419.

leverage is procyclical, reactions to movements in prices tend to be stronger than in those cases where the firm adopts a neutral approach.[18]

If the financial intermediary reacts to an increase (decline) in the price of an asset by purchasing (selling) assets of the same type, its behaviour could invigorate the existing upward (downward) price dynamics for that asset and, as a result, reinforce the leveraging (deleveraging) process. If the financial intermediary reacts by purchasing (selling) other assets, a positive correlation between otherwise unrelated assets can arise. For example, if the intermediary reacted to an increase (decline) in the price of an asset by purchasing (selling) a second asset, the increase in the demand (supply) for the second asset would put upward (downward) pressure on its price. The positive correlation between the prices of these different assets can only be explained because of a "portfolio effect": the intermediary either wants to incorporate new assets to its portfolio, or it wants to liquidate assets it already holds. [19] These portfolio effects could trigger new leveraging (deleveraging) dynamics. Moreover, the inability of financial markets to cope with the greater demand (supply) of assets that may result from market participants' reaction to changes in their balance sheets could put additional upward (downward) pressure on asset prices.

In deleveraging scenarios, the disposal of balance sheet assets can have spillover effects that can induce distress to others.[20] For example, such disposals can erode the balance sheets of other market participants who hold the assets that are

[18] See ibid 423.

[19] This "portfolio effect" describes the role of common asset holding as a channel of contagion. For an overview of the literature that examines portfolio effects, see Fabio Caccioli and others, 'Stability Analysis of Financial Contagion due to Overlapping Portfolios' (2014) 46 Journal of Banking & Finance 233, 233–35.

[20] See Adrian and Shin, 'Financial Intermediary Leverage and Value-at-Risk' (n 14) 4.

being liquidated.[21] That erosion may lead these market participants to start a deleveraging process of their own that will put additional downward pressure on asset prices. In addition, the decline in prices will reduce the collateral value of the assets held on the balance sheet, thereby impairing their holder's ability to use them to access secured finance.[22] I shall refer to these spill over effects as "asset value contagion", or "AVC". These asset value contagion effects can also run in the opposite direction, i.e. when firms seek to expand their balance sheets as part of a leverage strategy, they will put upward pressure on prices. Such an increase in prices will improve the collateral value of those assets and might give asset holders incentives to expand their balance sheet as well.

These asset value contagion effects may be described as externalities. In Chapter 4, I described an externality as a situation where the parties to a transaction would not internalise the costs or benefits that their behaviour will impose on others. For example, when market participants decide to liquidate their assets as part of a deleveraging process, the resulting downward pressure on the liquidated assets can have a negative impact on the balance sheets of other market participants. A similar, yet positive, externality effect would arise if market participants sought to increase their leverage levels: there would be a greater demand for assets, thereby putting upward pressure on prices and increasing the size of other participants' balance sheets.

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[21] In this sense, the reaction to the decline in the price of one asset can put downward pressure on the price of other assets as these are liquidated. The only reason for the apparent correlation between the prices of these two assets is the fact that they are part of the same balance sheet or investment portfolio. This is sometimes referred to as "portfolio contagion". See e.g. Caccioli and others (n 539). See also Carmen M Reinhart and Kenneth S Rogoff, *This Time Is Different : Eight Centuries of Financial Folly* (Princeton University Press 2009) ch 15.

[22] Kiyotaki and Moore are among the first to describe the effect of these "collateral squeezes" on the real economy. They describe the dynamic interaction between collateral asset prices and debt capacity. See e.g. Kiyotaki and Moore (n 534); Nobuhiro Kiyotaki and John Moore, 'Balance-Sheet Contagion' (2002) 92 The American Economic Review 46.

Besides its effect on asset prices, a reactive deleveraging can also lead to a funding crisis for a market participant that is unable to reduce the size of its balance sheet as funding is withdrawn. In other words: asset value contagion will increase the probability of a firm's insolvency.

There are several ways in which a firm's insolvency may be a source of systemic risk. For example, the firm's insolvency may trigger contagion effects across the financial system. These effects can arise in at least one of three forms. First, as a domino effect, where the firm's insolvency could induce direct losses in its counterparties' balance sheets.[23] Second, a "wake up call", where incomplete information may lead market participants to reassess their expectations about firms with similar characteristics to the insolvent firm or sharing common fundamentals with it.[24] Third, the firm's insolvency can spark irrational fears that could lead to contagion effects that are not rooted in direct credit exposures to the insolvent firm nor in their common fundamentals.[25]

Another way in which a firm's insolvency may be a source of systemic risk is through the disorderly liquidation of the firm's collateral assets by some of its creditors. In particular, as I described in Chapter 4, participants in securities financing and OTC derivatives markets have the right to seize and liquidate any held collateral immediately upon their counterparty's filing for insolvency. As creditors

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[23] This assertion is only tenable where the non-defaulting party's obligation was unsecured or under-collateralised. In any event, although these domino effects do exist, they tend to pose a relatively small threat to the broader financial system. See n 4.

[24] This is often referred to as "information contagion". For an overview of the literature on "information contagion", see Franklin Allen and Douglas Gale, *Understanding Financial Crises* (Oxford University Press, UK 2007) ch 10. For an analysis of information contagion in the context of banking, see Viral V Acharya and Tanju Yorulmazer, 'Information Contagion and Bank Herding' (2008) 40 Journal of Money, Credit and Banking 215.

[25] See e.g. G Andrew Karolyi, 'Does International Financial Contagion Really Exist?' (2003) 6 International Finance 179. See also George A Akerlof and Robert J Shiller, *Animal Spirits: How Human Psychology Drives the Economy, and Why It Matters for Global Capitalism* (Princeton Univeristy Press 2009).

attempt to dispose of securities collateral in large quantities, these post-default disposals may have to be effected at fire sale prices,[26] thereby putting downward pressure on the assets' prices and reinforcing asset value contagion effects.[27] As described above, this asset value contagion can lead to externalities.

Finally, a firm's insolvency could undermine financial stability if it were to affect the ability of the financial system to provide its core functions to the real economy. Even if the failing firm does not play a central role in the financial system, some of the firms affected by its failure may do. If that were the case, financial stability might be compromised; particularly if any of these firms were to become insolvent. However, financial stability may be affected even without these firms becoming insolvent, e.g. if they have to reduce the provision of their services or to raise their price to an extent where not all market participants can access financial markets for the provision of those core functions.

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[26] 'The term "fire sale" has been around since the nineteenth century to describe firms selling smoke-damaged merchandise at cut-rate prices in the aftermath of a fire.' Andrei Shleifer and Robert Vishny, 'Fire Sales in Finance and Macroeconomics' (2011) 25 The Journal of Economic Perspectives 29, 30. In modern financial research, the term has a slightly different meaning. Shleifer and Vishny define a fire sale as the forced sale of an asset at a dislocated price, i.e. below value in best use. See Andrei Shleifer and Robert W Vishny, 'Liquidation Values and Debt Capacity: A Market Equilibrium Approach' (1992) 47 The Journal of Finance 1343, 1343, 1364. 'The asset sale is forced in the sense that the seller cannot pay creditors without selling assets.' Shleifer and Vishny, 'Fire Sales in Finance and Macroeconomics' 30. The price is dislocated because those firms that are involved in a similar activity as the seller may face regulatory (e.g. antitrust) constraints and will not be able to bid. They may also face credit constraints as a result of debt overhang problems affecting many specialists simultaneously. As a result, assets will be bought by non-specialists who will only be willing to buy at low valuations. The final price will thus be below its value in best use, i.e. the value that firms with specialised knowledge would have bid. They call the difference between price and value in best use "asset illiquidty". See Shleifer and Vishny, 'Liquidation Values and Debt Capacity' 1344.

[27] 'The magnitude of these effects increases with the size of the defaulted counterparty and tends to be higher in concentrated markets.' Antoine Bouveret and others, 'Towards a Monitoring Framework for Securities Financing Transactions' (2013) ESRB Occasional Paper Series No. 2 5.

## III. AVC in securities financing and OTC derivatives markets

In securities financing and OTC derivatives markets, asset value contagion will normally arise through margin calls. Margin calls respond to contractual rights of participants in these markets to request that the level of collateralisation is adapted to reflect any change in the market value of the posted securities collateral.

For example, when the market value of a collateral asset declines, or when the applicable haircut rises, the collateral taker can request that the collateral provider transfers additional collateral assets to cover the resulting exposure.[28] In this sense, Brunnermeier and Pedersen argue that market liquidity, i.e. the ease with which an asset is traded, is sensitive to changes in funding liquidity, i.e. the ease with which traders can obtain funding, due to the existence of two liquidity spirals.[29] "Margin spirals" emerge if haircuts increase in times of illiquidity. Such increases will translate into a funding shock for traders: they will need to liquidate positions to free up capital that they can use to meet the margin calls.[30] This deleveraging process will put additional downward pressure on asset prices, which could, in turn, lead to higher haircuts, thereby restarting the cycle.[31] In addition, "loss spirals" may emerge if the decline in prices leads to calls for additional collateral.[32] The tightening of traders' financing conditions will increase market illiquidity, which in turn will affect traders' positions, forcing them to liquidate positions and depressing asset prices

[28] In the context of securities financing, see e.g. ICMA and SIFMA (ch 1, n 87) 4; ISLA (ch 1, n 87) 5.4–5.8. In OTC derivatives, margin calls may arise as a result of the change in the market value of posted collateral, but they may also arise from changes in the market value of the underlying asset. See e.g. ISDA, 'NY CSA' (ch 1, n 57) 3; ISDA, 'ENG CSA' (ch 1, n 87) 2, 10.

[29] See Brunnermeier and Pedersen (ch 4, n 26) 2204–2205.

[30] See ibid 2203–2205.

[31] See ibid.

[32] See ibid 2205.

even further, thereby restarting the cycle.[33] 'These liquidity spirals reinforce each other, implying a larger total effect than the sum of their separate effects.'[34]

In principle, we could observe similar spiralling effects, albeit in the opposite direction. If the market value of the collateral were to rise, or if the applicable haircut were to drop –for example, because the credit rating of the collateral provider or the credit rating of the security provided as collateral have improved–, the collateral taker would hold collateral in excess of the pre-agreed level of collateralisation. Normally, the collateral provider will be able to request that the collateral taker returns any such "excess collateral".[35] In these cases, the collateral taker will be exposed to a funding liquidity shock. If it doesn't hold eligible collateral assets that it can transfer to the collateral provider, the collateral taker will need to source them somewhere else. For example, it could borrow eligible securities collateral under a securities loan or a reverse repo. Alternatively, it could purchase those assets outright, or borrow cash under a repo.

The 2007-08 financial crisis provides evidence of the potential impact of these deleveraging spirals and their asset value contagion effects. For example, Begalle et al describe how, within a matter of days, the inability of a couple of investment firms to meet margin calls arising from the deterioration of the value of mortgage-related collateral led to the near collapse of Bear Sterns and to the intervention of the U.S. Federal Reserve Bank to mitigate stress in the repo market.[36] In the face of their inability to meet margin calls, those firms started to liquidate

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[33] See ibid.

[34] ibid.

[35] The GMSLA uses this term expressly. The GMRA, however, uses the term "Net Margin". See ICMA and SIFMA (ch 1, n 87) 2(gg). In the NY CSA and the ENG CSA, the amount of excess collateral is calculated according to a formula specified in the relevant agreement. See the references in n 28.

[36] See Brian Begalle and others, 'The Risk of Fire Sales in the Tri-Party Repo Market' (2013) Federal Reserve Bank of New York Staff Report no. 616 5–8.

subprime-mortgage-related securities at fire sale prices and 'prompted a reduction in collateral marks across many non-agency mortgage-backed securities that sparked additional liquidations as borrowers struggled to meet margin calls.'[37] The default of new firms on their margin calls led to their creditors' liquidation of collateral assets, which put downward pressure on the price of other assets.[38] Arguably, these fire sales played a significant factor in the demise of Bear Sterns.[39]

## IV. The multiplication effect of collateral re-use

As we saw in Chapters 2 and 3, participants in the SFTs and OTC derivatives markets can use a SICA or a TTCA to collateralise their transactions. When they use a SICA, only two parties will be exposed to changes in the price of the collateral asset: the collateral provider and the collateral taker. For example, if the price of the collateral asset were to drop, the ability of the collateral taker to satisfy her full claim in the event of her counterparty's insolvency against the collateral received might be impaired. In other words: the collateral taker would be exposed to additional credit risk. Standard contracts give the collateral taker the right to request that the collateral provider transfers eligible collateral to cover that additional exposure.[40] A similar

[37] ibid 6.

[38] See ibid 7.

[39] See ibid.

[40] See, generally, the provisions of the relevant standard agreements referred to in n 28. In the case of SFTs, the collateral provider will normally be able to choose whether she meets this Margin Transfer with Cash Margin or Margin Securities. See eg ICMA and SIFMA (n 96) para 4(d). Margin Securities, however, need to be acceptable to the collateral taker. See eg ibid 2(cc). Margin Securities need not be the same type of securities as Purchased securities. See Harding and Johnson (ch 4, n 41) 155. Nevertheless, if the collateral provider held Cash Margin or Margin Securities transferred by the collateral taker to meet a prior Margin Transfer, the latter will have the right to request that the collateral provider specifically uses such Cash Margin or Equivalent Margin Securities to meet her own Margin Transfer. See eg ICMA and SIFMA (n 96) para 4(d). In OTC derivatives markets, standard financial collateral arrangements do not expressly recognise the right of the collateral provider to choose the collateral assets that she will use to meet the margin call. See eg ISDA, 'NY CSA' (n 66) para 3(a); ISDA, 'ENG CSA' (n 96) para 2(a). Those assets, however, will need to be of

right would arise if the haircut that is applicable to the collateral were to rise.[41] In the opposite case, if the price of the collateral asset were to rise, or if the applicable haircut were to drop, the collateral provider would have the right to request that the collateral taker returned her equivalent collateral assets in the amount of any excess collateral held by the latter as a result of the change in prices or haircut.[42]

When participants in the SFTs and OTC derivatives markets use a TTCA to secure their transactions, which include an implicit right to re-use, or a SICA that provides the collateral taker with an express right to re-use, and the collateral taker exercises that express or implicit right, the number of claims that will be referenced to the price or the haircut of the collateral asset that has been re-used will increase. Normally, these new claims will be held by a different market participant, e.g. a "second collateral taker".[43] When the collateral taker re-uses received collateral she

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the types expressly recognised as Eligible Credit Support in the relevant financial collateral arrangement. See eg NY CSA, 13(b)(ii); ENG CSA, 11(b)(ii). Cash and high-quality securities are often recognised as such. Terms in capital letters used in this chapter should be read in accordance with the definition provided in the relevant standard agreements.

[41] In the case of OTC derivatives, the parties may also make calls for additional margin even if the price or the haircut of the posted collateral do not change. For example, they may call for additional margin to be posted or returned if the price of the underlying asset changes. See the provisions of the relevant standard agreements referred to in n 28.

[42] See, generally, the provisions of the relevant standard agreements referred to in n 28. In the case of SFTs, the collateral provider will only have the right to request that the collateral taker returns the same or equivalent collateral assets if the latter had received them as a result of a prior Margin Transfer. Otherwise, the collateral taker will have the right to choose the collateral assets that she will use to meet her Margin Transfer obligation. See eg ICMA and SIFMA (n 96) para 4(d). If the collateral taker is free to choose the collateral asset, the same conditions presented in note 40 apply. In OTC derivatives markets, the collateral provider will typically enjoy an express right to specify which equivalent collateral assets she wants returned. See eg ISDA, 'NY CSA' (n 66) para 3(b); ISDA, 'ENG CSA' (n 96) para 2(b). Nevertheless, the standard documents do not grant the collateral provider any express right to request the return of collateral assets other than Equivalent Credit Support, e.g. any other forms of eligible or ineligible collateral. I suspect, however, that this will be open to negotiation between the parties.

[43] There could be cases where the assets are re-used to meet an obligation with the counterparty that had originally transferred those assets. For example, the collateral taker could re-use collateral received under a repo to meet her obligation to return the same or equivalent assets to the collateral provider at the termination of the contract, or simply to meet a call for the return of excess margin. She could also re-use those assets to meet her collateral obligations to the same counterparty, albeit under a different set of transactions; e.g., under an OTC derivative. In these cases, technically, there is no "second collateral taker". Nevertheless, for the sake of discussion, in the remainder of the dissertation I will assume that the collateral taker will re-use received collateral with a second collateral taker.

changes her nature: she will still stand as a collateral taker vis-à-vis the collateral provider, but she will also stand as a collateral provider to the second collateral taker. In other words: upon her exercise of the right to re-use collateral, the original collateral taker will stand as a collateral taker and a collateral provider at the same time. As a result, assuming that collateral is re-used under a different transaction,[44] when collateral is re-used, there will be two claims that are referenced to the same collateral asset, and that will therefore depend on changes to its price or its haircut. If this second transaction involves a second collateral taker, then there will be two collateral providers and two collateral takers exposed to changes in the price or the haircut of the same collateral asset. Diagram 5.1 illustrates this multiplication effect when collateral velocity is 1; i.e., when the assets have been re-used only once.

Diagram 5.1. The multiplier effect of collateral re-use (velocity = 1)


The multiplication of collateral providers and collateral takers along the chain will be proportional to the velocity of collateral. If the asset is re-used a second time, i.e. if it is re-used by the second collateral taker, there will be three market participants exposed as collateral providers and three market participants exposed as collateral takers. Once again, the parties re-using the collateral ("re-users") will be exposed as both collateral providers and collateral takers. If collateral is re-used a third time, the number of collateral providers and collateral takers along the chain

[44] Even if that other transaction is with the same counterparty that posted the collateral originally. Unless the collateral is re-used to meet an obligation under the same contract that triggered the transfer in the first place, e.g. an obligation to return excess collateral, such re-use will increase the number of claims that are referenced to the same collateral asset, and thus will depend on changes to its price or its haircut.

will increase to four. It would continue to increase proportionally as the collateral is re-used to collateralise new transactions.

Diagram 5.2. The multiplier effect of collateral re-use (velocity = 2)


The re-use of securities collateral can also multiply the number of claims to return the same or equivalent collateral assets to those that have been re-used (hereinafter, "return claims"). Normally, the collateral provider will be entitled to the return of the same or equivalent assets upon the termination of the contract,[45] or if she exercises her right to substitute the posted collateral with other eligible collateral assets.[46] Unless the collateral taker exercises her right to re-use collateral –be it implicit, under a TTCA, or express under a SICA–, only the collateral provider will hold a right for the return of the same or equivalent collateral assets, and such right will only be exercisable against the collateral taker. If the collateral taker were to re-use the collateral, however, she would also hold a right for the return of the same or equivalent collateral assets in her capacity as a collateral provider vis-à-vis the second collateral taker. Like in the case of margin calls, assuming that collateral is

[45] In the context of SFTs, see e.g. ICMA and SIFMA (ch 1, n 87) 3(d)–3(f); ISLA (ch 1, n 87) 8, 16. In the context of OTC derivatives, see ISDA, 'NY CSA' (ch 1, n 57) 8(a); ISDA, 'ENG CSA' (ch 1, n 87) 2, 6. If there is an early termination of the contract, i.e. the contract is terminated before the agreed termination date as a result of default or any other event specified in the contract, the collateral provider's right to the return of the posted collateral will depend on the existence of any amounts due to the collateral taker. If so, the mutual obligations of the parties will normally be set off. See e.g. ISDA, 'ISDA MA' (ch 3, n 25) 6; ICMA and SIFMA (ch 1, n 87) 10(d), 10(n); ISLA (ch 1, n 87) 11.2, 11.8. For a list of the different events of default, see

For a list of other events leading to an early termination of the derivatives contract, see ISDA, 'ISDA MA' (ch 3, n 25) 5(b).

[46] In the context of SFTs, see e.g. ICMA and SIFMA (ch 1, n 87) 8; ISLA (ch 1, n 87) 5.3. In the context of OTC derivatives, see ISDA, 'NY CSA' (ch 1, n 57) 4(d); ISDA, 'ENG CSA' (ch 1, n 87) 3(c).

re-used under a different transaction, the exercise of such right to re-use will multiply the number of return claims. Similarly, if the collateral assets are re-used with a second collateral taker, the exercise of the right to re-use will also multiply the number of collateral providers and collateral takers along the chain as seen in Diagrams 5.1 and 5.2, and, consequently, the number of collateral takers that will be liable for the return of the same or equivalent assets to those received from their respective collateral providers. In Diagram 5.1, the number of collateral takers will be two, and in Diagram 5.2, it will be three.

The multiplication of margin calls and return claims, however, only arises when the right to re-use under a SICA or a TTCA is exercised to grant a security interest or to transfer full title over the assets under another financial collateral arrangement.[47] If the assets were sold outright, the purchaser of those assets would not have an obligation to return the same or equivalent collateral assets, nor would neither party be entitled to make margin calls as a result of changes in the price or the haircut of the asset sold. As a result, the outright sale transaction would

[47] The multiplication effect also arises if the collateral taker re-hypothecates the collateral assets. Granting a sub-security interest in the collateral assets will not affect the existence of the contractual relationship between the collateral provider and the original collateral taker. If they had agreed to hold a right to make margin calls in reaction to changes in the market price or the haircut of the collateral asset, the re-hypothecation of collateral will not affect those rights. Similarly, re-hypothecation will not eliminate the obligation of the original collateral taker to return the same or equivalent collateral assets upon discharge of the collateral provider´s obligations. Such an obligation, however, may be subject to the condition that the original collateral taker fulfils her own obligation vis-à-vis the second collateral taker, so that the former can discharge the collateral assets that the latter holds. This conditionality can be deemed implicit in the collateral provider's consent to re-hypothecation. Nevertheless, the collateral provider's return claim remains intact. Such conditionality could guarantee, however, that the obligations to return collateral can be fulfilled in an orderly manner. For an analysis of the implications of orderly transfers of collateral along a collateral chain, see Section V below. In any event, the relevant financial collateral arrangement may give the collateral provider the right to claim the return of the same *or equivalent* collateral assets. Indeed, that is the case in most standard arrangements. See e.g. ISDA, 'NY CSA' (ch 1, n 57) 3, 13; ISDA, 'ENG CSA' (ch 1, n 87) 2; ICMA and SIFMA (ch 1, n 87) 1(a), 3(f), 4(g); ISLA (ch 1, n 87) 1.1, 8. If the collateral provider requested that equivalent assets be transferred to her upon discharge of her obligations vis-à-vis the original collateral taker, the latter would subrogate herself in the former's proprietary rights over the collateral assets. If, for example, the collateral assets remained in a securities account in the name of the collateral provider but under the control of the second collateral taker, the securities could be transferred to an account in the collateral taker's name and remain under the control of the second collateral taker until the former's obligations are discharged. For a more detailed analysis of the creation of security interests in intermediated securities, see Chapter 1, Section II.C.

effectively fall out of the collateral chain. Technically, the collateral chain could not lengthen any more until the full title over equivalent assets returned to one of the participants along the chain.

It is important to note that the multiplication of collateral providers and collateral takers along the chain does not translate into the multiplication of physical collateral assets. It does not translate into the multiplication of ownership rights over the same asset either. It simply accounts for a multiplication of contractual claims; namely, margin calls and return claims.

# V. Collateral re-use can amplify the effect of prices as channels of contagion

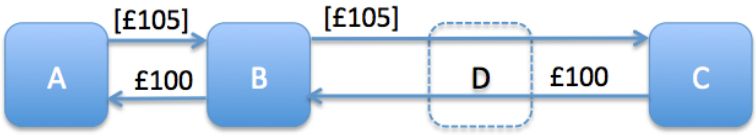
## A. Collateral re-use can deepen and broaden AVC effects

By multiplying the number of margin calls and return claims for any given collateral asset, collateral re-use can amplify the role of prices as channels of contagion. In order to illustrate this amplification effect, it will be useful to have a simple hypothetical scenario in mind. The sample transaction described in Chapter 2 presented a hedge fund (A) that was seeking to purchase a portfolio of securities on credit. A obtained credit from its prime broker (B), who financed the loan by borrowing £100m in cash from an insurance company (C) under a tri-party repo agreement. In order to collateralise the repo with C, B would re-use a portfolio of securities that A held in an omnibus account with B. The market value of the securities portfolio transferred was £105m. The resulting haircut for these securities was therefore 5%. The securities collateral and the cash would be transferred to the parties' relevant accounts at a third party clearing bank (D). Upon receipt of the

funds from C, B would transfer them to A under a reverse repo. Both repo transactions had a maturity of seven days and were to be marked-to-market on a daily basis. Each transaction was documented under a GMRA. Finally, I will assume that there are only two types of securities: those that are eligible as collateral ("eligible securities"), and those that are not ("ineligible securities").[48] It is important to note that the two categories need not be identical under each of the repo agreements.

When the contract is executed (i.e. $t_0$), the flow of assets will look something like the Diagram below.

Diagram 5.3. Sample repo transaction on $t_0$[49]




Let us further imagine that a change in the price of the securities used as collateral will entitle the relevant participants along that chain to make a call for the return of excess collateral or the transfer of additional margin, depending on the direction in which the price moves. Assuming that haircuts remained stable, if the price of the securities collateral rose to £110m on $t_2$, A (the collateral provider) would be entitled to ask B (the re-user) for the transfer of collateral to cover the increase in A's exposure (in this case, £5m), and B would have a similar right in

[48] The third type of asset in this simplified model will be cash. Normally, cash would be eligible to be posted as collateral as an equivalent asset to the eligible securities. Nevertheless, for the sake of discussion, in this example I will assume that market participants will value cash assets more than securities of the highest quality, e.g. eligible securities. In other words: they will only post cash collateral as a last resort measure.

[49] The clearing bank (D) is depicted with a dotted line because it does not stand as a principal in the transaction. In other words: it does not stand as a cash lender to B nor as a cash borrower from C, like a central counterparty (CCP) would do. D only settles the repo transaction on its books by moving cash and securities between different accounts.

relation to C (the second collateral taker).[50] If the price of the securities collateral declined to £100m, C would be entitled to request that B posts additional margin to cover the resulting exposure, i.e. £5m, and B would have a similar right in relation to A.[51] Similar rights to call for margin would arise if the haircut of the said securities collateral were to drop or increase.[52]

The amplification effect of collateral re-use on asset value contagion will depend on several factors. First, it will depend on the "virulence" of a margin call along a given collateral chain. For example, the deterioration of the credit worthiness of A could give B the right to call for additional margin.[53] Nevertheless, that deterioration would not normally give C a right to request that B posts additional margin. The deterioration of B's credit worthiness, however, could give both A and C a right to request additional collateral from the re-user (B). Something similar would occur if there were a sudden change in the price or the haircut of the securities collateral that supports the collateral chain. For example, if the price of the asset were to rise to £110m, as described above, we could expect the collateral provider and the re-user to make a margin call on their respective collateral takers for the transfer of collateral in the amount of £5m almost simultaneously. I shall refer to these margin calls that arise along the same collateral chain within a very short timeframe as "virulent" margin calls. The virulence of these margin calls will ultimately depend on the terms of the contracts that comprise the collateral chain.

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[50] See ICMA and SIFMA (ch 1, n 87) 4(a), 4(c).

[51] See ibid 4(a), 4(c).

[52] See ibid. If the haircut of the collateral asset drops, the effect on the collateral taker´s level of collateralisation is equivalent to an increase in the market value of the collateral. On the other hand, if the haircut of the collateral asset increases, the effect on the collateral taker´s level of collateralisation is equivalent to a decrease in the market value of the collateral.

[53] For example, participants in repo markets will typically regard downgrades in a counterparty's credit rating as an event that will give the other party a right to make a margin call. See Harding and Johnson (ch 3, n 38) 167.

Second, the amplification effect will depend on the ability of market participants along the same collateral chain to meet margin calls in order; i.e., if the re-user receives additional collateral that she can re-use to meet collateral obligations with her other counterparty along the chain. For example, if the price of the securities collateral decreases to £100m and C calls on B, the re-user, to post margin, an orderly transfer of collateral would require B to call on A (the collateral provider) to transfer, at least, the same amount of collateral, and B to re-use that additional collateral to meet her obligation with C. If the transfer is orderly, the impact on the price of the collateral asset will not be any different from the impact that it could have suffered had the asset not been re-used. In both cases, such an impact will depend on the collateral provider's behaviour to meet the margin call: if she held eligible assets on her balance sheet, prices would not be affected; but if she did not, then she may have to source them in the market, thereby potentially affecting their price.[54]

There are several reasons, however, why the re-user may be unable to meet margin calls in order: i) her margin call is due before her counterparty's;[55] ii) the additional collateral received from her counterparty is not enough to meet her own margin call;[56] iii) the additional collateral received from her counterparty is not eligible to meet her own margin call.[57] It is important to note that none of these

[54] For example, if she has to purchase eligible assets in the market, the resulting increase in demand will push up the price of those assets, holding everything else equal. Similarly, if A had to raise cash to meet B's collateral demands, she might have to liquidate assets, thereby putting downward pressure on their price.

[55] This may be a result of the two contracts providing for different valuation dates, or for the transfers being settled at different times, e.g. because securities are held in different jurisdictions with different settlement times or in different time zones.

[56] For example, the two contracts may provide for different valuation methods giving rise to calls for different amounts of margin. Similarly, the two contracts may apply different haircuts to the same collateral asset to reflect, for example, the different creditworthiness of their counterparties.

[57] The two contracts could have different lists of eligible collateral or, simply, the party making the call may request that specific assets be transferred. For example, the collateral provider may request

reasons is related to the validity or enforceability of the right to re-use. They mainly respond to differences in settlement times and, most importantly, to differences in the terms of each of the two contracts that form the collateral chain.

In the sample repo transactions presented above, we can expect B to negotiate the terms of the contract with C to match those of the contract with A as closely as possible to avoid, precisely, the problems described in the previous paragraph. Yet, that may not always be possible. For example, if B had re-used the securities portfolio to collateralise an obligation arising under an OTC derivatives contract with C, B would find some difficulties in mirroring the terms of the agreement with A: each transaction would contain very different obligations and, indeed, would be documented using different standard agreements. Most evidently, parties under an OTC derivative can make margin calls in response to variations in the market price of the posted collateral, as well as variations in the market price of the underlying assets.[58] Participants in repo markets do not enjoy the latter right. Moreover, the standard agreements may provide for different lists of eligible collateral. These are but a couple of examples of the differences between the collateralisation practices in each of these markets that can make the orderly transfer of collateral along cross-sectorial collateral chains particularly difficult.

If the re-user is unable to transfer collateral in an orderly manner, the effect on the price of the collateral asset can be more complex than in a situation where the collateral asset had not been re-used: it will now depend on how the collateral provider *and* the re-user will meet their respective margin obligations. If, for

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that equivalent securities collateral be returned, e.g. to exercise a right to vote, or to meet the eligibility criteria under another transaction, whereas the second collateral taker may have transferred cash collateral. Similarly, the second collateral taker may request that a margin call be met only with cash collateral, whereas the collateral provider may have transferred additional securities collateral. See nn 40 and 42.

[58] Section VI provides an illustrative example of how collateral re-use may aggravate asset value contagion effects in OTC derivatives markets.

example, the price of the securities collateral drops to £100m, and neither A nor B holds eligible assets worth £5m on their balance sheets to cover the resulting exposure,[59] they may have to source eligible assets in the market, putting pressure on prices, holding everything else equal.[60] In addition, if B, the re-user, decides to restore her original position, i.e. to recover the cash spent on the purchase of eligible assets, she may sell the assets posted by A upon their receipt. Holding everything else equal, this would put downward pressure on the asset's price, thus increasing its short-term volatility.[61]

If the price of the securities collateral were to rise to £110m, the potential effects on prices may not be as big. In our example, C, the second collateral taker, has not re-used the collateral assets received from B. Hence, if B were to request that C transfers collateral, in principle, C could return some of the Purchased Securities she holds on her balance sheet and would not need to source eligible assets anywhere

[59] This may be the case, for example, if participants in the repo markets reduced the scope of assets that they regard as suitable collateral. Gorton and Metrick document how, in 2007 and 2008, participants in the U.S. bilateral repo market raised the haircut of certain mortgage-backed securities, effectively eliminating the possibility of using those assets as collateral. See Gary Gorton and Andrew Metrick, 'Securitized Banking and the Run on Repo' (2012) 104 Journal of Financial Economics 425.

[60] This statement assumes that if market participants do not hold eligible Margin Securities on their balance sheets they will purchase them in the secondary market, thereby putting upward pressure on prices. In the case of Cash Margin, we can reasonably expect any market participant that expects a deterioration of market liquidity in the near future to dispose of her own cash resources as a mechanism of last resort. I shall refer to this situation as the "strong liquidity preference". Thus, under these circumstances, any market participant that lacks eligible Margin Securities will prefer to liquidate ineligible securities held on her balance sheet and use the liquidation proceeds to meet her margin obligations than depleting any cash resources she holds on her balance sheet. That would put downward pressure on the price of ineligible securities. Yet, market participants could also source eligible assets in the SFTs market, e.g. by borrowing cash or eligible Margin Securities. In that case, because the assets will not be publicly traded –there is only a temporary transfer–, there will not be an impact on market prices. It is important to note that the eligible assets need not be of the same type as those originally posted.

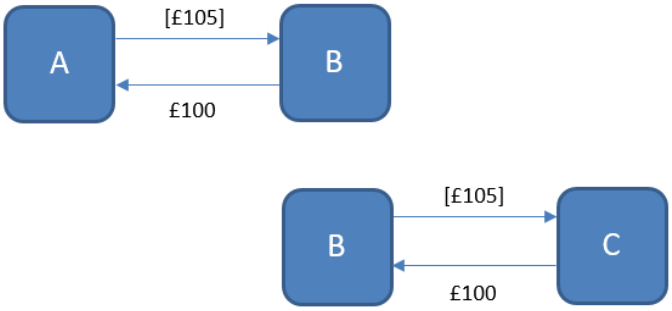
[61] If A and B purchased the same type of eligible asset in the market, the impact on the volatility of that asset's price will be greater than if A and B had purchased different types of eligible assets. In this case, the overall effect on prices is spread between more assets. The same would be true if A and B decided to liquidate balance sheet assets and use cash proceeds to meet their relevant Margin Transfer obligations. See n 60.

else.[62] As a result, even if B were unable to meet A's margin call in an orderly manner, a virulent margin call would lead to a lower number of outright transactions: only one, i.e. B's.

The potential effects on prices that we see along this collateral chain are similar to the ones that we could expect if the three parties that form that collateral chain were to enter into two parallel transactions that are collateralised with two different assets of the same type, e.g. because the original collateral taker is not allowed to re-use. In this case, if the asset's price decreases, the overall effect on the price of the collateral asset will always depend on the reaction of the collateral provider *and* the original collateral taker to the margin call, regardless of whether these calls are met in order or not. This effect could be larger than in the case where the re-user is allowed to re-use and the calls are met in order. It is important to note, however, that the effect is the same in both scenarios when the margin calls are not met in order. In other words: if there is a virulent margin call and the collateral asset has been re-used, one collateral asset would trigger the same number of outright sale transactions than two different assets of the same type would. This is a direct consequence of the multiplication effect described above: by increasing the number of margin calls over the same physical collateral asset, collateral re-use will also increase the number of potential outright sale transactions and thus, the potential effect on the asset's price.

[62] The same conclusion would hold if B required C to return Equivalent Margin Securities. If C were able to meet her Margin Transfer obligations by relying on her own cash resources there would be no impact on asset prices. This, however, would be unlikely under conditions of "strong liquidity preference". See n 60.

Diagram 5.4. Two parallel transactions




Besides i) the virulence of margin calls and ii) the ability of participants along a collateral chain to meet those virulent margin calls in order, there is a third factor that will determine the extent of the amplification effects: iii) the length of the collateral chains, i.e. the velocity of the collateral asset. As I described above, the various elements that can hinder an orderly transfer of collateral if there is a virulent margin call are directly related to the differences in the contracts that conform collateral chains. As a result, the longer the collateral chain, the greater the number of contracts that will form it, and, thus, the less likely it will be that a virulent margin call will be met in order.

Moreover, the number of market participants that form a collateral chain will normally increase as collateral velocity increases.[63] Therefore, greater collateral velocity will also make the overall effect on asset prices more complex given the greater number of market participants along a given chain that can be expected to react to a virulent margin call. If all these market participants react by purchasing and selling the same assets to meet their relevant obligations along the chain, they can deepen asset value contagion effects. For example, if the market value of the

[63] There could be cases where the same market participant appears twice in a collateral chain; e.g., if the original collateral taker were to re-use received collateral to meet a collateral obligation with the collateral provider under a different set of transactions. Nevertheless, for the sake of simplicity, I have excluded this type of situations from the scope of my analysis.

securities collateral decreases, and A (the collateral provider) and B (the re-user) purchase the same type of eligible asset to meet their respective margin calls, they will put upward pressure on the asset's price. If they do not hold enough cash to purchase these assets outright and need to liquidate ineligible assets to raise funds, the overall effect on asset prices can be even more complex.[64] Again, if the price of the securities collateral were to rise, the effects on prices would not be as big because one of the participants along the chain that would face a call to return excess margin, C (the second collateral taker), would, in principle, hold those assets on her balance sheet.[65]

In addition, a greater number of market participants liable to meet calls for the transfer of eligible assets can also broaden the scope of asset value contagion effects. For example, if B and A are liable to meet a virulent margin call, but they are required to liquidate ineligible assets to raise funds to source eligible assets in order to meet their obligations, the range of ineligible assets that can be liquidated will be broader, given that B and A may hold different ineligible assets on their balance sheet.[66] In other words: greater collateral velocity could increase portfolio effects.

The fourth and final factor is the number of collateral chains that a specific type of asset will support. If different assets of the same type support different collateral chains, then the potential overall effect on asset prices will be larger. The more collateral chains that are supported by the same asset type, the more virulent margin calls that could arise in the system. For example, if the same eligible asset used in the sample collateral chain presented above were used to support another

[64] For example, if they both decide to sell the same ineligible asset, their behaviour could put double the amount of downward pressure on the price of the said ineligible asset.

[65] Assuming that C has not re-used the collateral assets.

[66] The effect would be the same even if A and B decide to use the funds raised to meet their Margin Transfer obligations in cash.

collateral chain like it, and if the market price of the said collateral asset were to drop, we could expect the re-user and the second collateral taker under each of the collateral chains to make a call on their respective collateral providers to post additional margin.

These four factors will also apply in the case of return claims. Nevertheless, I must note several important differences. First, in the case of return claims, obligations can be as "virulent" as in the case of margin calls; yet, these obligations will only arise in one direction along the chain: only collateral takers will be liable for the return of the same or equivalent assets to their respective collateral providers, not vice versa. For example, if A, the collateral provider, decided to return the money to B, the re-user, the latter could transfer that money to C, the second collateral taker, to discharge her obligations. In this case, B and C would need to source assets that they can use to meet their respective return obligations. In principle, because C will not have re-used the collateral assets, she will still hold them on her balance sheet. Nevertheless, this need not guarantee that B will receive the assets before her obligation to A is due and, thus, B may still need to source cash or equivalent securities collateral in the market. Similarly, collateral velocity will also increase portfolio effects. Given that the amounts of collateral to be transferred in the case of return claims are likely to be much larger than in the case of margin calls,[67] the potential effect of collateral re-use in asset value contagion effects will also be larger.

Table 5.1 provides a summary of the four factors that can contribute to the amplification effect of collateral re-use on asset value contagion.

[67] It is important to note, however, that if the obligation to return were to arise as a result of an early termination, the final amount of collateral to be returned might be considerably lower if the parties had agreed on the application of a close-out netting mechanism, and that mechanism were legally enforceable.

Table 5.1. Amplification effect of collateral re-use on AVC: factors

| Factor | Effect on AVC |
|---|---|
| 1. Virulence of margin/return calls | • Deepen AVC.<br>• Broaden AVC (greater portfolio effects) |
| 2. Ability to meet margin/return calls in order<br>• Time call is due.<br>• Amount of collateral received<br>• Eligibility of collateral received | |
| 3. Length of given collateral chain (collateral velocity) | |
| 4. N. of collateral chains | |

As we saw in the previous section, one of the evident consequences of greater asset value contagion effects is the possibility of new margin calls being triggered in the same or different markets. If collateral re-use accentuates trends in asset prices, it could trigger margin spirals under the same contracts, as described by Brunnermeier and Pedersen. If collateral re-use broadens the scope of asset value contagion by increasing portfolio effects, it could trigger margin calls under different contracts, thereby contributing to spread price instability. The magnification of these asset value contagion effects can increase the liquidity pressure upon those market participants that are exposed to changes in the price of a given asset. As I described in Section II, the liquidity pressure that stems from asset value contagion would increase the probability of insolvency for those market participants. If insolvency were to materialise, it could unleash several systemic effects.[68]

## B. Collateral re-use will make re-users particularly vulnerable to AVC effects

The analysis in the preceding sub-section reveals an important concern: any re-user along a collateral chain will be particularly vulnerable to asset value contagion effects. This concern lies in the fact that a collateral re-user will stand both as a

[68] As I described in Section II above, these systemic effects include domino effects, information contagion, and irrational behaviour.

collateral provider and as a collateral taker in the same collateral chain. There are four factors that contribute to this vulnerability.

First, because she stands both as a collateral provider and a collateral taker, the re-user will be exposed to movements in the market price of the collateral asset in any direction. For example, if the price of the collateral asset that supports the collateral chain presented above were to rise, A (the collateral provider) could call on B (the re-user) to transfer collateral in order to cover the increase in A's exposure. If the price of the collateral asset were to decline, C (the second collateral taker) could call on B to post collateral to cover the former's increased exposure. This vulnerability to the market price of the collateral asset will expose B, the re-user, to constant liquidity pressure to meet potential margin calls from either side. Of course, B may have the right to make a margin call herself to her counterparties: to C if the market price were to rise, or to A if the market price were to decline. Nevertheless, as I described in the preceding sub-section, these calls may not always be made in order. But even if they were made in order, the re-user will be exposed to the credit risk of her counterparty: even if the latter cannot fulfil the margin obligation, the re-user will still be liable to meet her margin obligation under the relevant contract.

The second factor builds on that exact point: by re-using collateral, the re-user will be exposed to an otherwise inexistent counterparty credit risk. In the absence of re-use, if the price of the collateral were to decline, B would simply have a right to request that A posts additional margin; she would not face any potential margin calls herself. If the price of the collateral asset were to increase, B could simply return any excess collateral that she would hold on her balance sheet, or under her control, to A, if the latter so requested. If B re-uses the collateral assets to secure her obligation with C, the assets will be held on C's balance sheet, or under

C's control, and B would have to recover the assets from C to avoid having to find equivalent assets somewhere else at a cost.

This new counterparty credit risk will be particularly relevant if the collateral provider requests the return of all posted collateral; e.g. on the termination date, or if she discharges her obligations before that date.[69] In these cases, the re-user will be exposed to the risk that the second collateral taker is unable to return the received collateral. If that were to occur, the re-user would have to source equivalent collateral assets somewhere else. This could have a considerable impact on the asset's price.[70]

This new credit risk challenges some of the conclusions reached in Chapter 1 in relation to the functionality of collateral. In that chapter, I described the main function of collateral as the potential mitigation of counterparty credit risk for the collateral taker. Collateral, I argued, would transform the collateral provider's credit risk into a combination of other risks that the collateral taker would be able to manage at a lower cost. These new risks included: legal risk,[71] operational risk,[72]

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[69] In repo or securities lending transactions that have an open term, the collateral provider is normally allowed to repurchase the repo securities or to return the borrowed securities at will. See ICMA and SIFMA (ch 1, n 87) 16(c); ISLA (ch 1, n 87) 16. A similar right may be included in fixed term SFTs. See Harding and Johnson (ch 3, n 38) 11. In the case of OTC derivatives, the parties would need to reach an agreement to "tear up" the contract. See David Mengle, 'Credit Derivatives: An Overview' [2007] Federal Reserve Bank of Atlanta Economic Review 1, 19. Standard documents in SFTs and OTC derivatives typically give the collateral provider the right to substitute posted collateral with the consent of the collateral taker. See the provisions of the relevant standard agreements referred to in n 46. The exercise of such right would face the collateral taker with the same obligation to return the same or equivalent assets to those previously posted as collateral.

[70] The impact would normally be larger than the one we could expect in relation to margin calls given the amount of assets that would need to be transferred in this case. If the re-user has the option to meet her Margin Transfer obligation in cash and decides to do so, any liquidation of assets held on her balance sheet will put downward pressure on the price of those assets.

[71] Legal risks include the risk that the collateral taker may not be able to enforce her security interest in the collateral, or that another creditor will trump the collateral taker's priority over the proceeds of the sale of the collateral.

[72] An example of operational risk would be a deficient functioning of the clearing and settlement systems used to transfer securities.

market risk,[73] and management risk.[74] The extent to which collateral would mitigate the collateral provider's credit risk would ultimately depend on several factors: i) the specific costs associated with taking collateral, such as safeguarding the assets; ii) the probability of the new risks occurring; iii) the costs of assessing that probability; and iv) the losses that the collateral taker would incur if those new risks were to materialise. The analysis in this Section, however, shows that the re-use of collateral will expose the collateral taker to a new counterparty credit risk. This new risk could frustrate the potential of collateral to mitigate the collateral taker's counterparty credit risk and would thus cast a serious doubt on the main function of collateral for the collateral taker.

These two factors will expose the re-user to considerable liquidity pressure. A third factor, however, might contribute to the deterioration of the re-user's financial situation even further. Because she will stand as both a collateral provider and a collateral taker along the same chain, as her solvency deteriorates, her counterparties may reassess the re-user's credit risk at a similar point in time and impose stricter collateral requirements to protect themselves against a potential default. For example, in the collateral chain presented above, A, the collateral provider, might request that B, the re-user, reduces B's over-collateralisation and, thus, that she returns the excess collateral. Similarly, the second collateral taker, C, might request that B posts additional margin to reflect a lower creditworthiness. As we can see, these margin calls would pull B in opposite directions, effectively draining valuable resources from her balance sheet at a time where she might need them the most.

[73] This is the risk that the market price of the collateral assets goes down when the collateral taker attempts to sell them in the market to satisfy her claim.

[74] Management risks are related to the selection and valuation of collateral.

A fourth factor may expose the re-user to similar margin calls moving in opposite directions. In the preceding sub-section, I argued that the reaction of market participants to meet strings of margin calls along collateral chains could instil additional volatility in asset prices. In an episode of extreme volatility, the re-user could be exposed to contrary margin calls from its immediate counterparties along a collateral chain. If, for example, the two contracts that form the collateral chain presented above marked the collateral to market at different times,[75] B could find herself in a situation where A could call her to return excess collateral because the assets have been valued when the market price was high, and C could call B to post additional margin because the assets were valued when the market price was low. Akin to the situation described in the previous paragraph, these contrary margin calls could put considerable liquidity pressure on the re-user, thereby increasing the probability that she would file for insolvency.

# VI. The amplification of AVC in a sample OTC derivatives transaction

In Chapter 3, I provided a basic description of how OTC derivatives markets work. I also provided a basic sample transaction to illustrate how collateral re-use plays a central role in these markets. For the sake of simplicity, I will build on the same sample transaction to illustrate the potential impact on asset value contagion of collateral re-use in these markets.

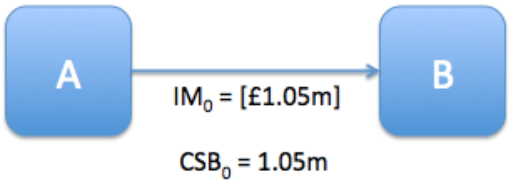
The sample transaction described in Chapter 3 presented a company (A) who had borrowed £100m from a bank (X) under a loan contract at an interest rate of 4%

[75] This could be the case if, for example, the re-user had signed these two contracts with counterparties that operate in different time zones.

payable yearly. Several months into the loan, A expected interest rates to drop and to remain low for some time. Consequently, A approached a dealer bank (B) to enter into a swap contract that would allow the former to hedge the risk of its expectations materialising. A and B agreed on a swap with the following terms: the swap contract would have a notional amount of £100m to replicate the principal in the loan; on a yearly basis, A would pay B a flexible interest rate (LIBOR+3%) over the notional amount, while B would pay A a fixed interest rate (4%) over the same amount and on the same yearly basis. They documented their swap transaction under an ISDA MA and the relevant Confirmation, and agreed to clear their obligations on a bilateral basis.

In addition, A and B agreed to use an ENG CSA to collateralise their swap agreement. They agreed to value their positions on a weekly basis and to exchange variation margin accordingly to cover the resulting exposures. Variation margin would be exchanged in cash. They also agreed that A would post initial margin in the amount of £1m, either in cash or securities. Depending on the asset, specific haircuts would apply. When the transaction was executed, i.e. on $t_0$, A transferred a portfolio of securities with a market value of £1.05m (i.e. with a haircut of 5%) to B. B would hold A's collateral assets in an omnibus account, commingled with those of other derivatives counterparties. For the purposes of this Chapter, I will also assume that there are only two types of securities in the economy: securities that will be eligible for collateral purposes ("eligible securities"), and securities that will not ("ineligible securities").

Diagram 5.5. Sample swap transaction: collateral flows on $t_0$




We had imagined that on the first Valuation Date, i.e. on $t_1$, B had a positive Exposure of £250,000. After A had transferred the resulting variation margin to cover that Exposure, B held collateral for a total market value of £1.3m, resulting from the sum of the variation margin and the initial margin received. Let us further imagine that, on $t_2$, B would re-use the securities portfolio to meet an obligation to transfer a Delivery Amount under another swap with a different dealer bank (C). This swap transaction will also be documented using an ISDA MA and an ENG CSA, and positions and collateral will be marked-to-market on a daily basis. Assuming that neither the positions nor the collateral assets posted under the swap transaction between A and B have changed in value, the flow of collateral on $t_2$ would look something like this:

Diagram 5.6. Sample swap transaction: collateral flows on $t_2$


Let us now suppose that, on $t_3$, the market value of the securities portfolio drops to £1m. Let us further assume that the haircut applicable to the securities collateral remains at 5%. In this situation, C could request that B transfers a margin

amount to cover the resulting Exposure, i.e. £50,000.[76] Such margin may be provided in the form of cash or securities collateral. Let us imagine that C requests the transfer of additional collateral with a market value of £50,000. As soon as B receives the margin call from C, B could make a mirroring margin call from A. If A holds eligible securities on its balance sheet, she could transfer them to B. This would not have any effect on prices. If A does not hold any eligible securities, however, she would have to liquidate ineligible assets and use the liquidation proceeds to meet her margin call with cash collateral.[77] This would put downward pressure on the price of ineligible assets. If eligible assets are received on time, then B could simply re-use them to meet her margin call with C.

If B did not receive eligible assets on time, then it would have to source them somewhere else. B would have several options. First, she could re-use eligible securities received from another collateral provider under a different swap transaction. In this case, there would be no effect on prices. Alternatively, she could sell ineligible securities received from this or another counterparty and use the liquidation proceeds to meet her margin obligations.[78] This would put further downward pressure on the price of ineligible assets. We would observe a similar effect on prices if B did not have access to assets of any of her counterparties and had to rely on her own assets instead.

If B were to receive additional eligible assets from A after having met her margin call with C, the effects on asset prices could be even more complex. If A held eligible assets on her balance sheet, there would be no additional effects on prices. If

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[76] See ISDA, 'ENG CSA' (ch 1, n 87) 2, 10.

[77] Under conditions of "strong liquidity preference", we can reasonably expect A to prefer to liquidate ineligible assets to meet her margin obligations than to give up her own cash resources.

[78] In theory, B could also re-use cash collateral received under that different swap transaction, or even her own cash, to purchase eligible assets. Nevertheless, under conditions of "strong preference liquidity", we can reasonably expect B to rely on these cash resources as a mechanism of last resort.

she did not, however, A would seek to liquidate some of the ineligible assets she holds on her balance sheet and use the liquidation proceeds as cash collateral to meet her obligations with B. This would put additional downward pressure on the price of ineligible assets. Moreover, if B were to replace any ineligible assets previously liquidated to fund her margin obligation with C, for example by using the cash collateral received from A, she would put upward pressure on the price of the ineligible securities. This would increase their price volatility and could magnify asset value contagion.

Had the portfolio of securities collateral not been re-used, the potential effects on prices would have been simpler since there would have only been one margin call: B would have called on A to post additional collateral in the amount of £50,000. Any potential effects on asset prices would have only depended on the reaction of one market participant, i.e. A, the original collateral provider.

Similar effects to the ones described above would have arisen had the market value of the securities portfolio remained constant, and had the applicable haircut risen, for example, to 10%. Assuming that the credit rating of the securities collateral remained constant, such a raise in haircuts could arise to reflect a change in the collateral provider's creditworthiness. Like in the description above, the affected collateral provider would have faced a margin call to post additional collateral with a market value of £50,000, i.e. the collateral taker's new exposure. In this case, however, the probability of a string of margin calls being made along the chain would be quite low since that would require a deterioration of the creditworthiness of all collateral providers along the chain. It is important to note, however, that changes in the market value of the collateral could also be reflected in higher haircuts. In this

case, the aggregate effect on prices would be even greater than when each change arises separately.

An increase in the market value of the portfolio of securities collateral, or a decrease in the applicable haircut, would lead to similar effects on asset prices, albeit in the opposite direction. For example, if the market value of the securities portfolio were to raise to £1.1m, collateral providers could request that their respective collateral takers returned equivalent securities worth £50,000 as excess collateral. Company A, for example, could make such a margin call on its dealer counterparty B. In turn, B may decide to make a similar call on dealer bank C. If C is unable to meet that call before B's call is due, B will have to source equivalent collateral assets somewhere else. In this case, similar problems arising from a disordered string of margin calls, as described above in relation to a drop in the market value of the securities portfolio, would arise.

Collateral re-users will be particularly vulnerable to changes in the market price of the collateral assets. In our example, dealer bank B will be exposed to changes in the market value of securities portfolio triggering margin calls from either side. If B were unable to source the necessary assets from its counterparty through a replica of the margin call received, she would face considerable liquidity pressure that could push it over the brink of insolvency. Additionally, in scenarios of extreme price volatility, if the parties' derivatives positions or the posted collateral were valued at different times during the day due to differences in the contract terms, B could be exposed to the risk of A and C making contrary margin calls and draining B's liquid resources.

If dealer bank B were to file for insolvency, a series of concerns for systemic risk would arise. For example, if the number of B's secured creditors were big, their

attempts to liquidate collateral at a somewhat similar point in time could lead to sales at fire sale prices. These sales could put even more downward pressure on asset prices and aggravate asset value contagion even further. Moreover, B's insolvency might lead to contagion effects: it will inflict losses on her unsecured creditors that could spark a domino effect in the markets, it could lead market participants to reassess the creditworthiness of other derivatives dealers, or it could trigger irrational fears in the derivatives market that could lead to destabilising behaviours. Finally, given the central role that derivatives dealers play as makers of OTC derivatives markets, if B were a large derivatives dealer, its insolvency could seriously undermine the ability of financial markets to provide a core function such as risk management to the real economy, thereby undermining financial stability.

These asset value contagion effects may seem irrelevant if considered on an individual basis. However, if the velocity of the same securities portfolio increased, the number of collateral providers and collateral takers that would be exposed to changes in their price would increase proportionately. A higher level of collateral velocity would reduce the probability that virulent margin calls will be met in order. If the resulting collateral chains spanned across different markets (e.g., if securities collateral were re-used to secure a repo transaction), that probability would be even lower. As the number of market participants along the chain increases, reactions to the virulent margin call will be more complex and the aggregate effect on prices could deepen. If we were to introduce more ineligible securities in the economy and market participants were able to liquidate these new assets, the scope of asset value contagion would broaden. These amplification effects would be magnified even further if other portfolios of the same type of eligible securities were used to support different collateral chains. It is important to note that, as collateral velocity increases,

the number of collateral re-users that will be vulnerable to changes in the price of the collateral asset supporting the chain will also increase.

# VII. Conclusion

Collateral re-use has been described as the oil that lubricates financial markets. This lubrication, however, presents an important risk: if a change in asset prices sparks a leverage or deleverage dynamic, the oil of collateral re-use can propagate the fire across the financial system.

The multiplication effect of collateral re-use can aggravate the role of prices as channels of contagion. Without collateral re-use, only one debtor may be forced to liquidate assets to meet her margin call. If the collateral asset is re-used, however, the multiplication of contractual claims that are referenced to that same asset can lead to a situation where more than one debtor is forced to liquidate assets.

An increase in the number of claims that will be referenced to the price of the re-used collateral asset need not have a significant impact on asset prices as long as the different claims along a collateral chain can be met in order; i.e., as long as a collateral re-user is able to receive collateral assets before she is due to transfer them. However, collateral velocity will reduce the probability that those claims will be met in order, particularly if the collateral chain spans different markets. If these claims cannot be met in order, complex dynamics will reinforce pressure on asset prices and, thus, deepen potential asset value contagion effects. This deepening effect can be particularly acute when the price of the collateral assets declines. The multiplication effect can also broaden the scope of asset value contagion as a result of increased portfolio effects. As asset value contagion effects become deeper and

broader, margin spirals will spread liquidity pressure to a growing number of market participants.

The analysis in this chapter also illustrates and important point: collateral re-users will be particularly vulnerable to changes in market prices. Because they will stand both as collateral providers and collateral takers along the same collateral chain, they may receive margin calls when the price of the collateral asset moves in any direction. Additionally, the re-use of collateral will expose the re-user to a new credit risk: that of the second collateral taker. This realisation would challenge the main function of collateral for the collateral taker, as described in Chapter 1: the minimisation of counterparty credit risk. As I shall describe in the following chapter, this credit risk exposure can also make the collateral taker more vulnerable to run-like behaviours.

# Chapter 6. The Effect of Collateral Re-use on Run Behaviour

## I. Introduction

Traditionally, in financial markets, the term "run" has been used to describe the 'unexpected and widespread withdrawal of short-term funding'.[1] Runs of depositors from the banks where they hold their deposits are, perhaps, the most evident example.[2] Runs can be systemic if they spread to numerous institutions across the market.[3]

In the aftermath of the 2007-08 financial crisis, international bodies such as the FSB, the BCBS, the IOSCO and the European Systemic Risk Board (ESRB) have identified run behaviours in SFTs and OTC derivatives markets as possible sources of systemic risk.[4] Bank supervisors have also expressed their concerns.[5]

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[1] Armour and others (ch 2, n 36) 318.

[2] Diamond and Dybvig were among the first to develop an economic model to explain this type of behaviour. See their seminal article Douglas W Diamond and Philip H Dybvig, 'Bank Runs, Deposit Insurance, and Liquidity' (1983) 91 Journal of Political Economy 401.

[3] Some commentators refer to systemic runs as "panics", particularly if there is an element of irrational behaviour involved: 'A panic, "a sudden fright without cause" (from the god Pan, known for causing terror), may occur in asset markets or involve a rush from less liquid securities to money or government securities – in the belief that governments do not go bankrupt because they can always print more money.' Charles Poor Kindleberger, *Manias, Panics, and Crashes: A History of Financial Crises* (6th edition, Palgrave Macmillan 2011) 104.

[4] These international bodies have expressed their main concerns with systemic risk in these markets in a series of reports. See e.g. FSB, 'Strengthening Oversight and Regulation of Shadow Banking. Policy Framework for Addressing Shadow Banking Risks in Securities Lending and Repos' (ch 1, n 63); BCBS and IOSCO, 'Margin Requirements for Non-Centrally Cleared Derivatives' (2013); Keller and others (ch 2, n 26). The Introduction to Chapter 7 provides a more detailed analysis of the roles that these international bodies have played in the regulatory initiatives that have arisen after the 2007-08 financial crisis.

Many of these concerns arise from academic studies that provide evidence of run behaviours in these markets during the 2007-08 financial crisis. For example, according to Gorton and Metrick, as uncertainty about banks' solvency grew and the value of certain repo collateral fell, repo lenders run away from repo collateral of dubious quality by raising repo haircuts, i.e. they required more collateral to secure their repo transactions.[6] Krishnamurthy et al provide a somewhat different explanation. According to their findings, haircuts in the tri-party repo market remained stable.[7] Repo lenders in this market reacted more abruptly than in bilateral repo markets by pulling their funding altogether.[8] In September 2008, for example, Lehman Brothers suffered a sharp decline in tri-party repo funding.[9] Bear Sterns may have also experienced a similar run.[10] In this light, turmoil in bilateral repo markets may have been due to dealers' reactions to their own capital and liquidity problems

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[5] The recent words of the Chair of the Federal Reserve Board, Janet Yellen, are quite illustrative: 'Indeed, in the 21st century, a run on a failing banking organization may begin with the mass cancellation of the derivatives and repo contracts that govern the everyday course of financial transactions.' Janet L Yellen, 'Opening Statement on the Proposed Rules Implementing a Net Stable Funding Ratio and Restricting Qualified Financial Contracts (3 May 2016)' <http://www.federalreserve.gov/newsevents/press/bcreg/yellen-opening-statement-20160503.htm> accessed 29 July 2016.

[6] See Gary Gorton and Andrew Metrick, 'Securitized Banking and the Run on Repo' (2010) Yale ICF Working Paper no. 09/14. The sharp increases in haircuts for certain asset-backed securities in the bilateral repo market may be the result of a loss of confidence leading market participants to produce costly information about those assets. This information insensitivity of collateral assets is deemed crucial for the expansion of secured credit. See Gary Gorton and Guillermo Ordoñez, 'Collateral Crises' (2014) 104 American Economic Review 343.

[7] See Arvind Krishnamurthy, Stefan Nagel and Dmitry Orlov, 'Sizing Up Repo' (2014) 69 The Journal of Finance 2381.

[8] See Adam Copeland, Antoine Martin and Michael Walker, 'Repo Runs: Evidence from the Tri-Party Repo Market' (2014) Federal Reserve Bank of New York Staff Report no. 506 4. One possible explanation might be that funding in the tri-party repo market is very short-term. See Adam Copeland, Antoine Martin and Michael Walker, 'The Tri-Party Repo Market before the 2010 Reforms' (2010) Federal Reserve Bank of New York Staff Report no. 477 69. In bilateral repo markets, pullbacks are reflected in a progressive escalation of haircuts. See Copeland, Martin and Walker, 'Repo Runs: Evidence from the Tri-Party Repo Market' 2–4.

[9] See Copeland, Martin and Walker, 'The Tri-Party Repo Market before the 2010 Reforms' (n 8) 55–61.

[10] See ibid 45.

in tri-party repo markets.[11] The ESRB and the FSB have reflected these interpretations in their own reports.[12]

In spite of their conceptual differences, both interpretations describe these runs or credit crunches as defensive mechanisms by repo lenders against repo borrowers, either in the bilateral repo market (Gorton and Metrick) or in the tri-party repo markets (Krishnamurthy et al). The ESRB and the FSB have made some vague references to the risk of runs in the opposite direction, i.e. of collateral providers running from collateral takers, e.g. the risk of hedge funds running away from their prime brokers in SFTs markets, but these international bodies have not described how such run risk could actually materialise.[13] In the OTC derivatives market, however, in light of the troubles experienced by Bear Sterns and Lehman Brothers in 2008, some economists have suggested that counterparties of a derivatives dealer will have an incentive to run from the latter if they doubt that it will not be able to meet the payments due under the contracts, or that they will not be able to recover the collateral they have transferred to it.[14]

Although collateral re-use plays a central role in how SFTs and OTC derivatives markets function, academic studies and reports issued by international bodies in the aftermath of the 2007-08 financial crisis have paid little attention to the

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[11] In the words of Krishnamurthy et al: 'Overall, the problems in the repo market during the crisis look less like the analogue of a traditional bank run by depositors and more like a credit crunch in which dealer banks tightened the terms for their borrowers.' Krishnamurthy, Nagel and Orlov (n 7) 2415. Copeland et al reach a similar conclusion. See Copeland, Martin and Walker, 'The Tri-Party Repo Market before the 2010 Reforms' (n 8) 2–3.

[12] See e.g. Bouveret and others (ch 5, n 27) 4–8; FSB, 'Strengthening Oversight and Regulation of Shadow Banking. Policy Framework for Addressing Shadow Banking Risks in Securities Lending and Repos' (ch 1, n 63) 4–6.

[13] See e.g. Bouveret and others (ch 5, n 27) 7; FSB, 'Strengthening Oversight and Regulation of Shadow Banking. Policy Framework for Addressing Shadow Banking Risks in Securities Lending and Repos' (n 72) 5. See also Duffie (ch 2, n 32) 64.

[14] See e.g. Squam Lake Working Group on Financial Regulation (ch 2, n 44) 4–5. The FSB and the ESRB have made timid remarks in this direction. See e.g. FSB, 'Strengthening Oversight and Regulation of Shadow Banking. Policy Framework for Addressing Shadow Banking Risks in Securities Lending and Repos' (ch 1, n 63) 5; Bouveret and others (ch 5, n 27) 7.

role that collateral re-use might play in the development of these run behaviours. The analysis of cash collateral re-investment practices undertaken by the FSB and the ESRB might be the only exception. Reports from these international bodies describe how when securities lenders, who often receive cash collateral under open term securities loans, re-invest it in assets with longer maturities,[15] there is a risk that securities borrowers will terminate their transactions and request that their cash collateral is returned.[16] The financial difficulty that AIG underwent in September 2008 is an illustrative example of this type of risk.[17] In addition, similar risks may arise when agent lenders reinvest securities lender's cash collateral into commingled funds, which offer less control and transparency than separate accounts.[18] But our understanding of how the re-use of securities collateral might give rise to similar run risks is incomplete.

Despite this incomplete understanding of run risks in SFTs and OTC derivatives markets, the said international bodies have made several regulatory proposals that aim to contain runs in these markets as a source of systemic risk. Some of these proposals, albeit unintentionally in many cases, will affect how market participants re-use securities collateral in these markets. I will describe these regulatory proposals in greater detail in Chapter 7. Before doing that, however, in this Chapter I will examine how the re-use of securities collateral might contribute to

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[15] This is an example of maturity transformation. Data collected by the Risk Management Association evidences that 'the weighted average maturity of cash collateral reinvestments denominated in US dollar and euro was elevated just prior to the onset of the crisis.' Bouveret and others (ch 5, n 27) 6. After the collapse of Lehman Brothers, cash collateral re-investment practices seemed to move away from liquidity transformation. See ibid.

[16] See FSB, 'Securities Lending and Repos: Market Overview and Financial Stability Issues' (ch 2, n 29) 18. See also Frank M Keane, 'Securities Loans Collateralised by Cash: Reinvestment Risk, Run Risk, and Incentives Issues' (2013) 19 *Current Issues*.

[17] See Keane (ch 5, n 16) 6–7.

[18] See FSB, 'Securities Lending and Repos: Market Overview and Financial Stability Issues' (ch 2, n 29) 18.

the development of run behaviours in SFTs and OTC derivatives markets. In Section II, I will provide an overview of the different theories that are typically used to explain run behaviours in financial markets. In Section III, I will explore in greater detail the role that collateral re-use might play in developing such run behaviours and, in particular, how collateral re-use might lead collateral providers to run from their collateral takers under certain circumstances. Section IV presents a sample transaction to illustrate how collateral providers in SFTs and OTC derivatives markets might run from collateral takers. Section V concludes.

## II. Bank run theories

Runs are normally understood as the unexpected and widespread withdrawal of short-term funds from a financial institution.[19] Traditionally, academic research has attempted to explain run behaviours from two different perspectives. Under the first approach, runs are regarded as 'undesirable events caused by random deposit withdrawals unrelated to changes in the real economy'.[20] Diamond and Dybvig's theory of bank runs by depositors is, perhaps, the most renowned example.[21] Their theory is based on three premises.[22] First, there is a change in expectations about the creditworthiness of a bank that gives its depositors an incentive to withdraw their money from the bank. Second, no single depositor has information about whether other depositors will or will not withdraw. Third, because of those information

[19] See n 1.

[20] Ana Babus, Elena Carletti and Franklin Allen, 'Financial Crises: Theory and Evidence' SSRN Scholarly Paper ID 1422715 4 <https://papers.ssrn.com/abstract=1422715> accessed 17 December 2016.

[21] See Diamond and Dybvig (n 2). Since Diamond and Dybvig's seminal article in 1983, other economists have advanced different variations of this model. For a brief overview of these variations, see Babus, Carletti and Allen (n 20) 4–6.

[22] See Diamond and Dybvig (n 2) 403–404.

asymmetries, a depositor will be tempted to withdraw her deposit fearing similar actions by other depositors.

The lack of coordination amongst the bank's depositors can put the bank under excessive liquidity pressure. In order to meet those demands, the bank can use the cash assets it holds on its balance sheet; but if these are insufficient, the bank will need to raise additional funds to avoid insolvency. It can do so by borrowing funds, most likely on a secured basis, against some of its balance sheet assets, or by selling those assets outright. Such sales may be made at fire sale prices.[23] This is likely to erode the bank's balance sheet to a point where the bank could tip over the brink of insolvency, thereby fulfilling depositor's own expectations.

The second approach to banking panics regards these as 'a natural outgrowth of the business cycle'.[24] Under this framework, depositors receive information about a downturn in the economic cycle and try to withdraw their funds in anticipation of financial difficulties in the banking sector.[25] 'According to this interpretation, crises are not random events but a response of depositors to the arrival of sufficiently negative information on the unfolding economic circumstances.'[26] Many of the economic models that fall within this second approach regard information asymmetries between banks and their creditors as a central element in bank panics.[27]

In the aftermath of the 2007-08 financial crisis, several academic studies have relied on these two approaches to explain some of the events that occurred in the SFTs and OTC derivatives markets. For example, Copeland et al have argued that, in

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[23] Bank's assets such as loans typically present high levels of information asymmetry: the creditor bank will normally have the best information available about the debtor. Thus, any other potential buyer will only be willing to purchase the asset at a discount. See Chapter 5, n 26.

[24] Babus, Carletti and Allen (n 20) 6.

[25] See ibid.

[26] ibid.

[27] For an overview of the most representative works, see ibid 7–9.

the tri-party repo market, in the presence of doubts about the solvency of the repo borrower, typically a dealer, repo lenders may decide to withdraw their funding even when holding high quality collateral. They present two possible reasons to explain this behaviour. First, some repo lenders may be reluctant or unprepared to take possession of the collateral,[28] or to increase the applicable haircuts.[29] Moreover, some of these repo lenders (e.g. MMMFs and cash collateral reinvestment pools) will have to worry about facing withdrawal pressure from their own investors.[30] In these cases, asymmetrical information about the dealer's solvency could precipitate a run,[31] and, in the presence of coordination problems between the dealer's repo lenders, it could lead to self-fulfilling dynamics, akin to a traditional bank run.[32]

Furthermore, a few academic studies have also emphasized the vulnerability of OTC derivatives markets to information asymmetries and co-ordination problems that lead to traditional bank run risks. For example, Duffie et al have argued that in the days leading up to the failures of Bear Sterns and Lehman Brothers, their derivatives counterparties 'preferred to novate their derivatives to dealers perceived to be more creditworthy'.[33] According to Duffie et al, 'these novations took cash

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[28] See Copeland, Martin and Walker, 'The Tri-Party Repo Market before the 2010 Reforms' (n 8) 3, 37. 'A security that is virtually free of credit risk, such as an agency security, may still be subject to liquidity, market, or interest rate risk. Even if this risk is very small, an investor would likely prefer to invest in a safe rather than a troubled collateral provider[.]' ibid 38.

[29] Indeed, Copeland et al found evidence that haircuts in the tri-party repo market remained quite stable during between mid-2008 and mid-2010. See Copeland, Martin and Walker, 'The Tri-Party Repo Market before the 2010 Reforms' (n 8) 45–67. Krishnamurthy et al reached a similar conclusion in their analysis of a broader data set. See Krishnamurthy, Nagel and Orlov (n 7).

[30] See Copeland, Martin and Walker, 'The Tri-Party Repo Market before the 2010 Reforms' (n 8) 3, 37–38.

[31] Dealers will have perfect information about their solvency and thus stand in a better position than its creditors to evaluate the probability of its filing for insolvency.

[32] Doubts about the solvency of clearing banks can aggravate these concerns. See Copeland, Martin and Walker, 'The Tri-Party Repo Market before the 2010 Reforms' (n 8) 43–45.

[33] Duffie, Li and Lubke (ch 3, n 3) 11. In the U.S., the Financial Crisis Inquiry Commission Report (FCIC Report) provides an example of how the refusal of Goldman Sachs to novate a series of swap transactions between Hayman Capital, a hedge fund, and Bear Sterns may have precipitated the

collateral and valuable business opportunities away from the already weakened dealers, adding to their strains in a way that may have contributed to their failures'.[34]

Duffie also describes how other derivatives dealers may have suffered similar runs that, unlike in the case of Bear Sterns and Lehman Brothers, did not result in the dealer's insolvency. Based on an analysis by Singh, Duffie describes how, between March 2008 and March 2009, the exposures of OTC derivatives to Citibank, after netting and collateral, fell from $USD126bn to $USD81bn, 'suggesting that counterparties significantly reduced their exposures to a dealer whose solvency was in question'.[35] By comparison, over the same period, OTC derivatives exposures to 'comparatively healthy J.P. Morgan' rose from $USD68bn to $USD86bn.[36]

Besides these academic studies that rely on traditional approaches to bank run risks, other academic studies of the SFTs markets during the 2007-08 financial crisis have suggested a third alternative approach to explain run behaviours. This third approach focuses on shifts in the sensitivity of certain debt claims to new information.

Gary Gorton and Bengt Holmstrom stand as the main proponents of this approach. In different papers, they have defended the use of short-term debt instruments to solve information asymmetry problems that typically affect other financial instruments, mostly equity.[37] Holmström, for example, has emphasized the

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demise of the latter. See Financial Crisis Inquiry Commission, 'The Financial Crisis Inquiry Report' (2011) 287–288 <http://fcic.gov/report>.

[34] Duffie, Li and Lubke (ch 3, n 3) 11.

[35] Duffie (ch 2, n 32) 66.

[36] See ibid.

[37] See e.g. Gary Gorton and George Pennacchi, 'Financial Intermediaries and Liquidity Creation' (1990) 45 The Journal of Finance 49; Gorton and Ordoñez (n 604); Bengt Holmström, 'Understanding the Role of Debt in the Financial System' (2015) BIS Working Papers No. 479 <http://www.bis.org/publ/work479.htm>; Tri Vi Dang, Gary Gorton and Bengt Holmström, 'Ignorance, Debt and Financial Crises' (2015) Working Paper <http://www.columbia.edu/~td2332/Paper_Ignorance.pdf>.

different information dynamics that underlie debt and equity markets.[38] Unlike in equity markets, holders of certain debt claims do not require perfect information. Instead, they regard a series of elements as proxies for the low risk of their claims. For example, the short-term nature of the debt claim reduces the incentives of the debt holder to invest in a due diligence exercise to assess the credit risk of her counterparty. A right to exit the contract quickly and at face value will also reduce those incentives.

Another proxy is the collateralisation of debts. Collateralising debt instruments also helps minimise information asymmetry problems. If information about the collateral is costly to produce, the debtor who transfers collateral will have little incentives to engage in a due diligence exercise that would otherwise give her an advantage over the creditor, thereby leading to an asymmetric situation.[39] If the collateral taker can exit the contract quickly and at face value, she will not have an incentive to assess the quality of the collateral either.[40] Both parties will be "symmetrically ignorant".[41]

The over-collateralisation of the claim will further discourage the parties from engaging in due diligence exercises.[42] If the debt holder has a claim of £100m against the collateral provider, and the latter transfers to the former assets worth £200m, that over-collateralisation will reassure the debt holder that, in the event of insolvency, she will be able to satisfy her claim. As a result, these instruments are

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[38] See e.g. Holmström (n 37) 5–7. For an analysis of the different information dynamics that underlay stock markets and derivatives markets, see Awrey (ch 3, n 23).

[39] See Gorton and Ordoñez (n 6) 344–345.

[40] See Kathryn Judge, 'Information Gaps and Shadow Banking' (2016) Columbia Law and Economics Working Paper No. 529 10 <https://papers.ssrn.com/abstract=2751205> accessed 19 November 2016.

[41] See Holmström (n 37) 24.

[42] According to Holmström: 'When both parties know that there is enough collateral, more precise private information about the collateral becomes irrelevant and will not impair liquidity.' ibid 5.

often described as "information-insensitive".[43] Money claims are a paramount example.[44]

Under this light, '[o]pacity can dominate transparency, and the economy can enjoy a blissful ignorance.'[45] Indeed, without information production, 'the perceived value of all collateral tends to be the same […] such that some collateral is known to be bad, but it is not known which specific collateral is bad'.[46] A panic might unravel if a shock gives market participants incentives to produce information about the debt instruments.[47] In other words: information-insensitive instruments become information-sensitive. Holders of these claims will typically prioritise liquidity and safety over expected returns.[48] Because gathering information about these claims will be costly, debt holders will seek to exercise their right to exit without attempting to collect any information. Unlike in the two traditional views described above, under this light, runs do not occur as a result of a coordination problem. Nor will they occur as a result of an information asymmetry: because none of the parties to the transaction will have that information, both of them will be "symmetrically ignorant". Rather, the same "information gaps" that allowed markets to expand in

[43] See Gorton and Ordoñez (n 6) 344. For an earlier discussion on the purposefulness of the information-insensitivity of debt claims, albeit in the context of discussions about the protection of uninformed investors in trading, see Gorton and Pennacchi (n 37).

[44] See Holmström (n 37) 5–6. See also Judge (n 40) 9–13.

[45] Gorton and Ordoñez (n 6) 345.

[46] ibid.

[47] See ibid 344; Holmström (n 37) 15. Von Thadden shares the concerns expressed by Gorton, Holmstrom and their respective co-authors with the sensitivity of debt claims to information, but he emphasizes 'the danger looming in the stock of short-term debt when expectations change: a shift of stocks of debt outstanding can be more dangerous than a change in flows'. Von Thadden's commentary to Holmstrom's paper in ibid 38. For an overview of the run model of von Thadden and his co-authors, see Antoine Martin, David Skeie and Ernst-Ludwig von Thadden, 'The Fragility of Short-Term Secured Funding Markets' (2014) 149 Journal of Economic Theory 15; Antoine Martin, David Skeie and Ernst-Ludwig von Thadden, 'Repo Runs' (2014) 27 Review of Financial Studies 957.

[48] See Judge (n 40) 9.

times of confidence contribute to their shrinkage in turbulent times.[49] Financial fragility is, thus, endogenous.[50]

Under this third approach, a small shock may lead to a systemic crisis.[51] Some relatively small shocks will suddenly instil in market participants an incentive to produce information about their counterparties and the collateral assets they have received from the latter.[52] Runs may thus manifest themselves in specific markets, in relation to specific collateral assets. One way in which such run on collateral assets may materialise is by a raise in the haircut applicable to the collateral.[53] Gorton and Metrick have found evidence of these haircut increases in several securitised bonds used as collateral in the bilateral repo market during 2007 and 2008.[54] Moreover, Covitz et al provide evidence of run behaviours in the market for asset-backed commercial paper (ABCP),[55] another example of collateralised debt instruments, in

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[49] See ibid 25.

[50] See Gorton and Ordoñez (n 6) 344.

[51] Gorton and Ordoñez describe how the crisis in the sub-prime mortgage market had relatively small effects on the financial sector. See ibid 343–344. Additionally, in their own words: '[T]he origin of a crisis is exogenous, but not its size, which depends on how long debt has been information-insensitive in the past and, hence, how large the corresponding boom has been.' ibid 345.

[52] The lack of information production contributes to consumption and output because market participants can borrow regardless of the quality of the collateral. In this light, 'opacity can dominate transparency, and the economy can enjoy a blissful ignorance'. Gorton and Ordoñez (n 6) 345. As a result, the longer the time that market participants have relied on information insensitivity, the greater the probability that a negative aggregate shock will lead to a shift in the sensitivity of collateral assets to information production. See ibid.

[53] According to Gorton and Metrick, 'It is the rise in haircuts that constitutes the run on repo. An increase in a haircut is tantamount to a withdrawal from the bank, forcing deleveraging on a large scale.' Gorton and Metrick (n 579) 429.

[54] See Gorton and Metrick (n 53).

[55] Firms normally use ABCP programmes to issue short-term liabilities that are backed against receivables. The issuing companies tend to be bankruptcy-remote, i.e. the assets of the programme are protected from the bankruptcy of the firm that sells them to the programme. See Daniel Covitz, Nellie Liang and Gustavo A Suarez, 'The Evolution of a Financial Crisis: Collapse of the Asset-Backed Commercial Paper Market' (2013) 68 The Journal of Finance 815, 815, 822. According to Covitz et al, the range of assets that were financed in the ABCP market broadened in the years prior to the 2007-08 financial crisis. See ibid 815. 'By the end of 2006, ABCP outstanding in the United States had grown to $1.1tn, larger than the amount of unsecured (non-asset-backed) commercial paper outstanding and a significant part of the U.S. shadow banking system.' ibid. (Footnotes omitted.)

2007.[56] They argue that runs in ABCP programmes were caused by information asymmetry problems.[57] However, Judge notes that the complexity of the securitized assets that underlay many ABCP programmes contributed to reducing the probability of adverse selection problems.[58]

Despite their differences, these three approaches to run behaviours complement each other.[59] Indeed, they have important elements in common. For example, they regard over-collateralisation as a mechanism to reduce the relevance of information asymmetries. Technically, deposit insurance, which Diamond and Dybvig present as a solution to contain the run risk they identify in traditional bank deposits, is not a form of collateralisation; it is a swap in the depositor's counterparty credit risk: instead of being exposed to the credit risk of the depositary bank, the depositor will be exposed to the credit risk of the deposit insurance scheme. Typically, these schemes will be funded by a consortium of banks. Because the probability of all the funding banks failing will be lower than any one of them failing individually, deposit insurance is said to minimise the depositor's counterparty credit

[56] See Covitz, Liang and Suarez (n 55). They consider an ABCP programme to be in a run if, despite more than 10% of its outstanding paper being scheduled to mature, the programme does not issue, or when it was deemed to be in a run in the previous period and continues not to issue. See ibid 827. They find that 'nearly 40% of programs (more than 120 programs) were in a run at the end of 2007', and that 'runs in the crisis were not random but instead were significantly more likely at riskier programs'. ibid 818. Their work complements that of Krishnamurthy, who has described how the maturities of ABCP programmes shortened in the summer of 2007. See Arvind Krishnamurthy, 'How Debt Markets Have Malfunctioned in the Crisis' (2010) 24 The Journal of Economic Perspectives 3. For an analysis of how the collapse of the ABCP market might have contributed to spreading the scope of the 2007-08 financial crisis, see Carlos Oscar Arteta and others, 'Revenge of the Steamroller: ABCP as a Window on Risk Choices' (2013) FRB International Finance Discussion Paper No. 1076 8–13 <https://www.federalreserve.gov/pubs/ifdp/2013/1076/IFDP1076.pdf>.

[57] See Covitz, Liang and Suarez (n 55) 818.

[58] See Judge (n 40) 24. Indeed, that may help explain why, in light of the evidence presented by Covtiz et al, ABCP holders did not run from all funds. Runs may have been triggered by a signal that only affected a subset of assets backing ABCP programmes. See ibid 36.

[59] Judge acknowledges that Information gaps probably operate in conjunction with coordination problems to increase the probability and size of panics. See Judge (n 40) 6.

risk. It is this mitigation effect that resembles collateralisation.[60] If the depositor's claim against the depositary bank is below the maximum amount protected by the deposit insurance scheme, the depositor is, essentially, over-collateralised. In theory, that over-protection will reduce the incentives of the depositor to monitor the solvency of the depositary bank.[61]

Moreover, the claims that give rise to run incentives are all of a contingent nature, which gives claim holders the ability to exercise their rights against the debtor upon the occurrence of an uncertain event.[62] In particular, it is the discretionary nature of the contingency the occurrence of which will give rise to the debtor's obligation that can precipitate runs, not the short-term nature of the obligation. For example, the obligation of the bank to return equivalent cash to depositors is not of a short-term nature: it arises as a result of the depositor's demand to withdraw those funds.[63] Such demand is a contingency that is determined by discretionary factors. Similarly, an open-term repo is not a short-term asset, for its maturity will depend on the decision of either party to end their contractual

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[60] Indeed, Armour et al, for example, describe repos as a mechanism of "private deposit insurance". The analogy rests on two important elements: i) over-collateralisation and ii) the application of bankruptcy safe harbours, which allow the collateral taker to retain or sell the securities collateral in the event of her counterparty's default and to use the proceeds to satisfy her claim. Moreover, they note that these two elements, coupled with the absence of a cap, made repos an attractive alternative to traditional bank deposits for cash-rich entities. See Armour and others (n 159) 442–44.

[61] In support of this view, see Gorton and Pennacchi (n 37) 51. They also regard the government's issuance of debt securities as "riskless assets" that would reduce incentives to produce information due to the lower credit risk associated with them. See ibid.

[62] Within the last fifty years, English courts have varied their definition of "contingent liabilities". Today, a broader definition seems to prevail. For example, in the Sutherland case, Lord Reid, in the House of Lords, referred to a contingent liability as 'A liability which, by reason of something done by the person bound, would necessarily arise or come into being upon an event or events which might or might not happen.' *Winter v Inland Revenue Commissioners* [1963] A.C. 235, 249. For an overview of the different interpretations adopted by English courts in the past, see Gabriel Moss, 'Proof Positive - Supreme Court Expands Scope of Provable Contingent Liabilities' (2013) 26 Insolvency Intelligence 108, 109.

[63] Indeed, in the landmark decision of *Foley v. Hill*, Lord Lyndhurst affirmed that: 'Money, when paid into a bank, ceases altogether to be the money of the principal (see *Parker* v. *Marcliant*, 1 Phillips 360); it is then the money of the banker, who is bound to return an equivalent by paying a similar sum to that deposited with him *when he is asked for it*.' *Foley v Hill* (1848) 2 HLC 28, 9 ER 1002, 1005 (emphasis added).

relationship. Such a request to terminate the repo transaction is also a contingency of a discretionary nature. It is important to note, however, that the contingency of a specific event actually occurring or not may also be determined by absolute, i.e. non-discretionary, factors.[64] For example, the occurrence of an "Event of Default" or an "Early Termination Event", as described in the relevant standard agreements used to document repo and OTC derivatives transactions, will give rise to the contingent obligation of the party that stands with a net debt to transfer the necessary assets to her counterparty to satisfy that debt.[65]

# III. Collateral re-use can aggravate the risk of runs

## A. Collateral re-use will accentuate run incentives in certain collateral providers

Collateral re-use can aggravate the risk of runs by accentuating the incentives of collateral providers to run from their respective collateral takers in several ways. First, as I described in Chapter 1, by transferring collateral assets to the collateral taker under a TTCA, the collateral provider will effectively relinquish her proprietary interest in the collateral assets. She will only have a contractual claim against the collateral taker for the return of the same or equivalent assets. When the collateral provider grants the collateral taker a right to re-use under a SICA, the same effects will only arise upon the collateral taker's actual exercise of the right to re-use. Until

[64] See *In re Nortel GmbH (in administration) and related companies* [2013] UKSC 52, [136].

[65] See ISDA, 'ISDA MA' (ch 2, n 25) 6; ICMA and SIFMA (ch 1, n 87) 10(c); ISLA (ch 1, n 87) 11.2. For a list of the different events of default, see ISDA, 'ISDA MA' (ch 2, n 25) 5(a); ICMA and SIFMA (ch 1, n 87) 10(a); ISLA (ch 1, n 87) 10.1. For a list of other events leading to an early termination of the derivatives contract, see ISDA, 'ISDA MA' (ch 2, n 25) 5(b). Indeed, a contingent liability may arise from contract or statute. See *In re Nortel GmbH (in administration) and related companies* [2013] UKSC 52, [131], [132].

then, the prevailing opinion among legal scholars is that the collateral provider will retain her proprietary interest in the assets.[66]

When the collateral provider relinquishes her proprietary rights in the collateral, she will only have a contractual claim against the collateral taker for the return of the same or equivalent collateral assets. In theory, this relinquishment will expose the collateral provider to the credit risk of the collateral taker. For example, if the collateral taker filed for insolvency, the collateral provider's claim would stand as an unsecured claim and rank *pari passu* with other unsecured creditors. The probability of an unsecured creditor recovering a given percentage of her claim will be considerably lower than the probability of a secured creditor recovering the same percentage.[67]

In practice, however, an enforceable close-out netting arrangement will provide the collateral provider with some security. A close-out netting arrangement is not a security interest in the collateral assets. Nevertheless, if enforceable, it will allow the parties to net their mutual obligations. As a result, only the counterparty whose aggregate claims have the largest value will stand as a creditor, and only for a net amount. If the collateral provider and the collateral taker have only entered into one financial transaction and that transaction is over-collateralised, then only the collateral provider will have a claim against the collateral taker, and only for the return of the over-collateralised amount, not for the return of all the collateral originally posted.

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[66] For a detailed analysis of this position, see Chapter 1, n 113.

[67] Gerard McCormack points to some interesting data from the end of the 1990s provided by the Society of Practitioners of Insolvency: "on average 75 per cent of cases return nothing to unsecured creditors and in only 2 per cent of cases can they expect to receive 100 per cent returns." McCormack (Introduction, n 2) 7.

If the collateral provider relinquishes her proprietary interest in the collateral and the collateral taker files for insolvency, the collateral provider will only have a contractual claim against the collateral taker for the return of the over-collateralised amount: the collateral provider does not lose any security interest in the assets, she goes from being their (equitable) owner to being an unsecured creditor. Because unsecured creditors have a lower probability of recovering their full claims in an insolvency proceeding than preferential creditors, that collateral provider will have an incentive to anticipate the collateral taker's filing for insolvency in order to maximise the probability of recovering the over-collateralised amount. In this sense, doubts about the solvency of a collateral taker that engages in collateral re-use might lead her collateral providers to run, i.e. to try to anticipate the collateral taker's potential filing for insolvency to avoid having to rank *pari passu* with other unsecured creditors to satisfy her claim. The greater the number of these running collateral providers is, the greater the liquidity pressure on the collateral taker will be.

The factor aggravating the collateral provider's incentive to run from the collateral taker is not the over-collateralisation of the latter's exposure per se, but the former's relinquishment of her proprietary interest when granting a right to re-use. It is true, however, that the collateral provider could have an incentive to run from the collateral taker even if the latter did not have a right to re-use the assets, e.g. if the collateral provider's proprietary interests were inadequately protected. Tracing problems are, perhaps, the most evident example, as illustrated by the frustration of many counterparties of Lehman Brothers to recuperate their assets after the firm's

UK subsidiary filed for insolvency.[68] Since then, market participants seem to be warier of this type of risk.[69] Regulators have also sought to improve the protection of clients' assets by making them aware of more secure custody arrangements and by redefining certain insolvency proceedings.[70] Nevertheless, even if we assumed that the collateral provider's proprietary interests in the collateral were adequately protected, e.g. through individual segregation, the collateral taker's exercise of a right to re-use those assets would undermine that protection and revive the collateral provider's incentives to run.[71]

Collateral re-use can aggravate run incentives in one additional way. If a collateral provider relinquishes her proprietary rights, her claim for any over-collateralised amount will rank *pari passu* with the claims of all other unsecured creditors in an insolvency proceeding. Effectively, that collateral provider's relinquishment will increase the number of unsecured claims in a hypothetical insolvency proceeding and, as a result, it will reduce the pro rata share that each

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[68] Tracing problems relate to the difficulty of identifying specific proprietary interests when the assets are of a fungible nature. See e.g. the discussion on the problems of tracing equitable rights in securities that are held through an indirect holding system in Chapter 1, Section III.A. Tracing clients' money became a prominent problem in the litigation that ensued the filing of the UK subsidiary of Lehman Brothers. See eg *Lehman Bros International (Europe) v CRC Credit Fund Ltd* [2012] UKSC 6.

[69] See eg Carlsson-Sweeney (n 168).

[70] See eg Investment Bank Special Administration Regulations (SI 2011/245), as amended by the Investment Bank (Amendment of Definition) and Special Administration (Amendment) Regulations (SI 2017/443). In Chapter 7, I describe some of the changes introduced in the FCA Handbook, Client Asset Sourcebook (CASS) after the demise of Lehman Brothers in order to improve clients' awareness of the risks involved in the relinquishment of proprietary interests over their assets.

[71] Over-collateralisation can also aggravate the collateral provider's incentives to run by increasing the number of scenarios where those incentives will be salient. In a scenario where a given financial transaction, e.g. a swap, is not collateralised, only the party that is in-the-money will have an incentive to run from an ailing counterparty to avoid having to present her unsecured claim in the insolvency proceedings. When the swap is collateralised, however, if one party posts initial margin, that party might have an incentive to run from an ailing collateral taker even when the former is out-of-the-money: if the amount of initial margin is larger than the collateral provider's obligations vis-à-vis the collateral taker, the application of close-out netting will still leave the former with an unsecured claim for the difference. The collateral provider may have an incentive to run if her proprietary interests are not adequately protected, e.g. if she anticipates tracing problems, but if the collateral taker had exercised a right to re-use, any attempt to protect those proprietary interests adequately will be ineffective.

individual unsecured creditor will receive from the estate that remains after paying preferential creditors. This reduction in the pro rata share will increase the incentives that *any* unsecured creditor already had to run from the collateral taker. In short: the more a collateral taker relies on collateral re-use, the greater the incentives of her unsecured creditors to run if there are doubts about the former's solvency.

It could be argued, however, that the relinquishment of the collateral provider's proprietary interests and subsequent re-use by the collateral taker will also increase the assets available in the latter's estate to satisfy unsecured claims, thereby cancelling out the effect on the pro rata share described in the previous paragraph. For example, this will be the case if the collateral taker decides to sell or lend the collateral assets. But there are other cases where the collateral taker's re-use of the collateral will not create a new asset on the latter's balance sheet; e.g. if the collateral taker re-uses the collateral to meet a margin obligation under a different transaction.

Collateral takers are not required by law to inform either the collateral providers whose assets are being re-used, or any other unsecured creditor, of the *specific purpose* for which collateral is being re-used. In order to assess the precise effect that the collateral taker´s re-use practices would have on their probability of recovering their full claims in a hypothetical insolvency proceeding, unsecured creditors would need to engage in a very costly exercise of information gathering.[72]

[72] As I shall describe in Chapter 7, some financial institutions are required by law to inform their collateral providers of the re-use of the latter's posted collateral in general terms. In the U.K., see e.g. FCA Handbook, Investment Funds Sourcebook ("FUND"), r 9.2.1 R (3)(c). In the U.S., prime brokers are not required to inform their customers when they re-use the latter's assets, but they will need to inform the latter when they deposit assets in the latter's reserve accounts, which the prime broker cannot re-use. See 17 C.F.R. s 240.15c3-3(e)(3), (f). Moreover, some institutions are also required to disclose general information about their collateral re-use practices. In the U.K., this information is normally included in a disclosure annex. See e.g. CASS, r 9.3.1 R. In the U.S., it is normally disclosed in quarterly financial reports to the SEC known as 10Qs. Nevertheless, this information is rather vague. It does not cover elements such as the type and number of collateral providers from whom re-used collateral has been received, nor the amount of collateral received under a TTCA and the type and number of collateral providers from whom it was received. This detailed information would have to be collected by individual creditors at their own initiative. Although the collateral taker is required

Although that costly information might reveal an improved prospect of recovery, that improvement would never lead to the full recovery of their claims.[73] In other words: that costly exercise would never eliminate their original incentives to run. As a result, unsecured creditors would not seek to collect that information. If the collateral taker were nearing insolvency and her unsecured creditors knew, however superficially, that she engages in collateral re-use, they would probably interpret that as an element that would deteriorate their positions in a hypothetical insolvency proceeding and would thus try to run. If these unsecured creditors ran in an uncoordinated manner, the resulting liquidity pressure on the collateral taker could push her over the brink of insolvency, thereby fulfilling the formers' own expectations.

These conclusions provide a critical perspective on information insensitivity as a desirable feature of debt claims. Recent academic studies defend that by reducing the incentives of collateral takers to produce information about the solvency of their collateral providers, the over-collateralisation of credit exposures will facilitate access to credit and promote economic growth.[74] These studies warn that the same information insensitivity that can support confidence in good times can also undermine it in bad times.[75] The analysis in this sub-section illustrates that, when coupled with a right to re-use, over-collateralisation can have further destabilising effects. Due to the unsecured nature of the collateral provider's claims, such over-collateralisation will aggravate the collateral provider's incentive to reduce her exposure to the collateral taker to increase the probability of recovering the over-

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to keep an accurate record of how she re-uses collateral, it is at least questionable, however, that the she would agree to share that information with her creditors on a voluntary basis.

[73] By definition, if a company is insolvent, the value of its assets is below the value of its liabilities.

[74] See the academic studies that defended the purposeful opacity of debt claims to guarantee their information insensitivity, cited in n 52.

[75] See n 49.

collateralisation amount. Intuitively, the larger the over-collateralisation amount is, the greater the incentive will be. Additionally, the collateral taker's right to re-use can accentuate those incentives by reducing the pro rata share of all her unsecured creditors on a hypothetical insolvent estate. If these unsecured creditors run in an uncoordinated manner, they could precipitate the collateral taker into insolvency.

## B. Collateral re-use will increase the vulnerability of collateral takers to collateral liquidity

Re-using collateral can also make the re-user particularly vulnerable to collateral illiquidity, i.e. the ease with which a market participant can access eligible collateral assets to meet its obligations to post or return collateral.[76] This increased vulnerability will further accentuate the incentives of unsecured creditors to run from a re-user.

The reason behind this vulnerability lies in the actual exercise of the right to re-use the collateral assets. As I described in the previous Chapter, when the collateral taker re-uses the received collateral, her nature will change: not only will she stand as a collateral taker (to the original collateral provider), but she will also stand as a collateral provider (to the second collateral taker). In that Chapter, I described how this "dual nature" would make the re-user vulnerable to *any* changes in the market price of the collateral asset through margin calls. The re-user's dual nature also illustrates her exposure to a new credit risk: that of the second collateral taker. The ability of the re-user to meet any obligation to transfer collateral to the collateral provider without drawing on her own resources will depend on the

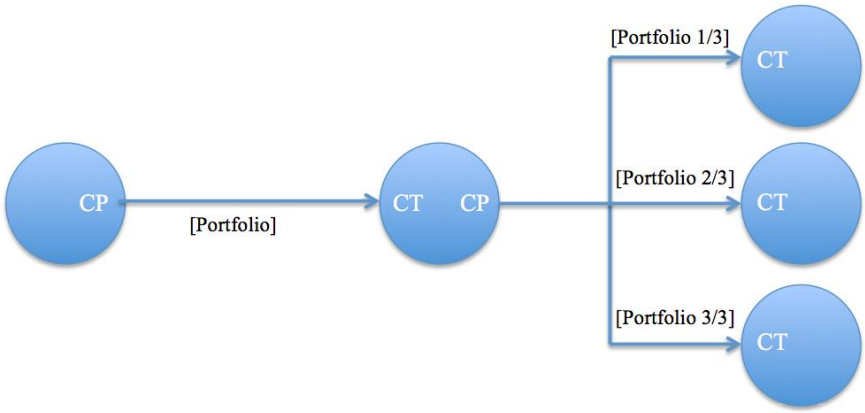
[76] Some economists have proposed the term "balance sheet liquidity" to describe this phenomenon. See e.g. Martin, Skeie and Thadden (n 47) 981. The term "collateral liquidity" seems better suited for the purposes of this dissertation.

former's ability to source the necessary collateral from the second collateral taker. If she is unable to do that, she will have to source those collateral assets somewhere else at a cost.

The re-user's exposure to the credit risk of the second collateral taker is particularly relevant to assess the former's risk of suffering a run. For example, if the collateral provider requests that the collateral taker returns the same or equivalent collateral, e.g. because the collateral provider wants to substitute the posted collateral with other eligible assets, or because she wants to discharge her obligations to the collateral taker, if the latter has disposed of the collateral assets, these will not be immediately available to her, unlike in a situation where the assets have not been re-used and they remain under her control.

If the collateral taker has re-used different parts of the portfolio of securities collateral with different counterparties, i.e. if there is more than one second collateral taker, the re-user's counterparty credit risk will be even more acute. Indeed, collateral chains can branch out. Diagram 6.1 illustrates this phenomenon. Under these circumstances, it will be even more difficult for the re-user to coordinate the return of the whole portfolio of securities collateral from the different second collateral takers as the probability that the terms in the different financial collateral arrangements will differ will be greater. The greater the number of second collateral takers, the lower the probability of coordinating the return of the whole portfolio of securities collateral.

Diagram 6.1. Collateral chain that branches out to link different second collateral takers




In a crisis scenario, if the collateral taker is in a delicate financial situation and she is unable to request equivalent assets from the second collateral taker(s),[77] she may be unable to source those assets somewhere else given its financial constraints. Even if she were able to do so, the costs that she would incur might worsen her financial situation, pushing her closer to the brink of insolvency. This would affect the ability of the re-user to meet similar obligations with other collateral providers and would thus further reinforce the latters' incentives to run from the re-user.

Moreover, the multiplication effect of collateral re-use, i.e. the multiplication of the number of claims that will be referenced to the same collateral asset and the number of market participants along a given collateral chain,[78] will hinder the ability of the first re-user to retrieve the collateral assets in a relatively short period of time

[77] For example, because the terms of the respective financial collateral arrangements with the second collateral taker(s) will not allow the re-user to source the collateral on time to meet her obligations with her collateral providers, or because, if the crisis is systemic, the second collateral taker(s) might themselves be unable to meet their obligations vis-à-vis the re-user.

[78] In principle, the multiplication of claims need not result in a multiplication of market participants. For example, the re-user could re-use the collateral assets to meet her obligations vis-à-vis the collateral provider from whom she received the collateral in the first place. For the sake of discussion, however, I will assume that collateral will be re-used with different counterparties, and that, as a result, the multiplication effect of collateral re-use will increase the number of claims and market participants along a given collateral chain.

because their retrieval will now depend on the coordination of a greater number of market participants, i.e. the onward (third, fourth, etc.) collateral takers. If the second collateral taker is unable to retrieve those assets from the third collateral taker(s) on time to meet her obligations with her collateral providers, she will have to source the assets somewhere else at a cost. As we examined in relation to the original collateral taker, that might put considerable liquidity pressure on the second collateral taker and could erode her financial solvency. Such erosion could spark the incentives of her unsecured creditors to run.

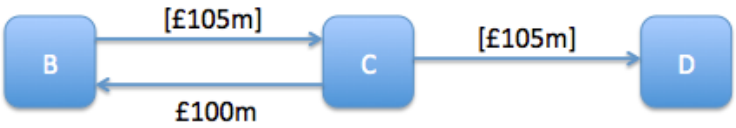
The multiplication effect will also increase the probability of a systemic run, i.e. the probability that run behaviours will affect various institutions across the market. For example, collateral liquidity constraints might lead the original collateral taker to request that the second collateral taker returns the posted collateral. This demand might lead the second collateral taker herself to request the return of the posted collateral from the third collateral taker, and so on. The differences in the terms of the respective financial collateral arrangements will reduce the probability that such transfers of collateral are met in order. As we saw in the previous chapter in relation to asset value contagion, that collateral chains lengthen in order does not necessarily mean that they will unwind in the same orderly fashion.

## IV. A sample transaction

Let us imagine a situation where a dealer bank (B) sells a portfolio of securities worth £105m to an insurance company (C) for £100m. B and C further agree that the former will repurchase a portfolio of the same or equivalent securities at a later date for £101m. The securities portfolio thus carries a haircut of 5%, and the repo rate is 1%. B and C document their repo transaction using a GMRA.

Let us further imagine that, upon receipt of the securities portfolio, C re-uses it to collateralise a bilateral swap with derivatives dealer (D). The swap has a duration of five years. In particular, C uses the securities portfolio to meet the initial margin requirements that C and D have agreed to in their contract. C and D use an ISDA MA to document the swap, and an ENG CSA to document their financial collateral arrangement. Let us also assume that the haircut applicable to the securities that conform the said portfolio is also 5%. Diagram 6.2 depicts the collateral chain.

Diagram 6.2. Sample collateral chain




Insurance company C and derivatives dealer D, as collateral takers under the repo and the swap transactions, respectively, hold a right to re-use the securities portfolio. Their right to re-use is subject only to the obligation to return the same or equivalent collateral assets upon the occurrence of one of several contingencies: i) the collateral provider's discharge of her obligations,[79] ii) the collateral provider's request to substitute the posted collateral with other eligible collateral assets as agreed under the relevant financial collateral arrangement,[80] or iii) the early termination of the transaction as a result of an Event of Default,[81] or an Early Termination Event.[82] In addition, the collateral taker may be required to return some, but not all, of the posted collateral assets if iv) the collateral provider requests the

[79] See ISDA, 'ENG CSA' (ch 1, n 87) 2, 6; ICMA and SIFMA (ch 1, n 87) 3(d) – 3(f).

[80] See ISDA, 'ENG CSA' (ch 1, n 87) 3(c); ICMA and SIFMA (ch 1, n 87) 8.

[81] In relation to the swap transaction, see ISDA, 'ISDA MA' (ch 2, n 25) 5(a), 6. In relation to the repo transaction, see ICMA and SIFMA (ch 1, n 87) 10(a), 10(c).

[82] See ISDA, 'ISDA MA' (ch 2, n 25) 5(b), 6.

return of any "excess collateral" held by the collateral taker as a result of an increase in the market price of the securities collateral.[83] Among these, the first two contingencies are of a discretionary nature, and the last two are of an absolute nature.

The collateral takers in this chain, i.e. C and D, are over-collateralised. In the context of SFTs, the collateral taker's exposure will be over-collateralised as a result of the application of haircuts to the securities collateral; in our example, 5%. In the context of OTC derivatives, there are two factors that contribute to the over-collateralisation of the collateral taker's exposure: initial margin and haircuts. In principle, variation margin aims to cover the collateral taker's exposure to changes in the market value of the underlying obligations. Initial margin aims to cover any additional losses that variation margin could potentially leave uncovered. Hence, the latter effectively over-collateralises the collateral taker's exposure. Additionally, in OTC derivatives, haircuts operate in a similar fashion than in SFTs. They will apply to any securities collateral that is posted to meet either variation margin or initial margin requirements.[84] In our simplified example, the securities portfolio under the swap carries a 5% haircut, like in the repo transaction that preceded it, and the over-collateralised amount is the total market value of the securities portfolio, i.e. £105m.

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[83] In the case of SFTs, the collateral taker will have a right to choose how she meets the Margin Transfer obligation unless she had received Cash Margin or Margin Securities from the collateral provider in compliance with prior Margin Transfer obligations. In that case, the collateral provider may request that the collateral taker returns those specific assets as part of the latter's Margin Transfer obligation. See ICMA and SIFMA (n 96) para 4(d). In the case of OTC derivatives, the collateral provider has an express right to choose. See ISDA, 'ENG CSA' (n 96) para 2(b). In the previous chapter, I defined "excess collateral" as the amount of collateral that the collateral taker will hold above the total amount that she I entitled to hold under the contract. The collateral taker may hold excess collateral if, for example, the market value of the received collateral raised or its haircut decreased.

[84] It is important to note that haircuts over securities collateral posted as variation margin will only result in over-collateralisation if the collateral taker's exposure is fully collateralised. For the sake of discussion, I will assume that it is. The use of securities collateral to meet variation margin requirements in OTC derivatives is rather rare, however. For a detailed analysis of the current margin practices in OTC derivatives, see Chapter 3.

In our example, the collateral providers under the repo and the swap transaction, i.e. dealer bank B and insurance company C, respectively, have each relinquished their proprietary rights in the securities portfolio: B transferred full title over the portfolio to C under the repo, and then C transferred the recently acquired full title to D to collateralise the swap transaction.[85] D currently holds the full title to the securities portfolio.

Because B and C have relinquished their proprietary rights in the portfolio of securities collateral, they will each have an unsecured claim against their respective collateral takers for the return of the same or equivalent collateral upon the occurrence of one of the four contingencies described above in relation to the repo transaction. If i) B were to discharge her obligations, or if ii) she sought to substitute the securities portfolio for other eligible collateral, B would have an unsecured claim against C for the market value of the whole portfolio: i.e., £105m.[86] If iii) the transaction remained open but the market value of the securities portfolio raised, e.g. to £110m, B would have an unsecured claim against C for the return of part of the portfolio that the latter will hold in excess of the agreed collateral requirements; i.e. £5m. If iv) C were to file for insolvency, which the GMRA regards as an Event of Default,[87] B would have an unsecured claim against the insolvent estate for C's obligation to return the portfolio of securities collateral net of B's own obligation to

[85] In our example, both transfers of the securities portfolio are done under a TTCA. Had the collateral been transferred under a SICA that expressly recognised the collateral taker's right to re-use, e.g. a NY CSA used to collateralise the swap transaction, the collateral provider would not have relinquished her proprietary rights in the portfolio until the collateral taker had actually exercised her right to re-use.

[86] I assume that the market value of the securities portfolio will have remained unchanged.

[87] See ICMA and SIFMA (ch 1, n 87) 10(a)(vi).

repurchase it at the agreed Repurchase Price; i.e. £101m.[88] In this case, B would thus have a claim for £4m.

Under the swap transaction, in the first three scenarios, C, as a collateral provider, would have the same unsecured claims against D that B had against C in the repo transaction. In the fourth scenario, i.e. were D to file for insolvency, C would have a right to claim the return of any over-collateralised amount. In the swap transaction, the initial margin acts as an additional factor of over-collateralisation for the collateral taker. Hence, C's unsecured claim would be greater, i.e. £105m,[89] than in the case of the repo transaction.

Given the unsecured nature of their claims, B and C will have an even stronger incentive to run from their respective collateral takers if they were to change their expectations about the latter's solvency. Additionally, other unsecured creditors of the collateral takers might feel even more incentivised to run from the collateral taker if they knew about B's and C's re-use of collateral but lacked information about the specific purpose of those disposals and, thus, whether any new assets would be entering the estate.

It is important to note that, by exercising her right to re-use, C has put itself in a rather vulnerable position. If one of the four contingencies described above were to occur, C may have to use her own liquid resources to meet her obligations with B. If C were indeed in a tight financial situation, B's claim would expose C to additional liquidity pressure. If doubts about C's financial solvency spread across the market, other collateral providers like B could also seek to reduce their exposures to C. Their uncoordinated behaviour could put enough liquidity pressure on C to push it over the brink of insolvency.

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[88] See ibid 10.

[89] I assume that the market value of the securities portfolio will have remained unchanged.

The only way for C to avoid depleting its own resources to meet her obligations with B would be to retrieve the necessary collateral assets from D. That, however, may not be very straightforward. For example, the terms under the swap contract may not allow C to retrieve the necessary collateral at will or in time to meet its obligations with B. Additionally, had D re-used the assets itself, the probability that D would be able to return the requested assets to C in time for the latter to fulfil its obligations to B would be even lower. For example, the terms under the contract between D and the onward collateral taker may differ from those under the repo and the swap contract. More generally, C will be exposed to D's credit risk: if D is unable to meet C's requests for the return of the necessary collateral under the swap contract, C will still be liable to meet B's claims under the repo transaction. In fact, C's requests to D might expose the latter to considerable liquidity pressure and contribute to deteriorate the latter's financial solvency, just as B's requests might do for C. In this case, we could expect D's unsecured creditors, including other collateral providers, to attempt to reduce their credit exposures to D in an uncoordinated manner. As different market participants along the same collateral chain start to run from each other, the phenomenon could reach a systemic dimension. In sum: the longer the collateral chain, the greater the probability of a systemic run.

Let me illustrate how B and C, as unsecured creditors of their respective over-collateralised collateral takers, might try to run. There are several ways in which B and C could attempt to reduce their credit exposures to C and D, respectively.

First, and most evidently, B and C could decide to discharge their obligations, thereby forcing their respective collateral takers to return a portfolio of the same or equivalent securities. For example, if the repo had an open tenor, B could simply

terminate the transaction by giving adequate notice to C.[90] B would need to repurchase the portfolio of securities at the Repurchase Price agreed in the contract. If the contract had a fixed tenor, the parties could reach an agreement to terminate the contract before maturity, where one party would pay the other depending on the valuation of the underlying obligations. Alternatively, some observers have argued that collateral takers could reduce their exposure to collateral providers by reducing the maturity of the repo.[91]

It may be more difficult for C to discharge its obligations under the swap agreement with D given that the transaction has a longer maturity, i.e. five years. C and D could certainly reach an agreement to terminate (or tear-up)[92] the contract before maturity, where one party would pay the other depending on the valuation of the underlying obligations. Similarly, C could try to novate the derivatives contract by entering into an agreement with a third party, typically another derivatives dealer (E), who would stand between the two original counterparties parties with the expectation of making a profit.[93] In these cases, D may apply different initial margin requirements to E than those that it applied to C as a result of each of these counterparties having a different credit rating.[94] If, for example, E is not required to post any initial margin, D will need to return a portfolio of the same or equivalent securities collateral to C.[95] If D does not have access to those assets, e.g. because it

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[90] See ICMA and SIFMA (ch 1, n 87) 16(c).

[91] See Matt King, 'Are the Brokers Broken?' (Citigroup 2008) 5.

[92] See Mengle (ch 5, n 67) 19.

[93] See n 33. Similarly, in the context of SFTs, a collateral provider could try to assign its rights and obligations under the contract to a third party. See e.g. ISLA (ch 1, n 87) 21.

[94] Indeed, traditionally, dealers do not normally request initial margin in inter-dealer transactions. For a detailed analysis of margin practices in OTC derivatives markets, see Chapter 3.

[95] Variation margin requirements are likely to remain the same. In this sense, we could reasonably expect the net collateral taker to retain any variation margin posted by the net collateral provider. Probably, the new derivatives dealer will compensate the net collateral provider for those assets if, for

has re-used them, it will need to source them somewhere else at a cost. This will translate into additional liquidity pressure for D.

If D were facing a liquidity constraint, we could expect it to oppose these strategies vehemently since they would put it under additional liquidity pressure. However, if D wants to avoid sending adverse signals of its weakness to the markets, it may have no choice but to accept C's requests.[96] A similar argument could apply to participants in securities financing markets if the relevant transaction had a fixed term and one of the parties sought to discharge her obligations in advance of the termination date.

Second, B and C could attempt to reduce the over-collateralisation of their respective collateral takers. For example, B could try to reduce the haircut that is applicable to the securities portfolio. In that case, C would be liable to return any excess collateral that results from the application of a lower haircut. In our example, if the parties were to reduce the haircut to 3%, B could require C to return the same or equivalent securities to those held in the portfolio with a market value of £2m.[97] However, unless this possibility had been included under the parties' GMRA, B and C would need to reach an agreement. Not only would one expect the negotiations to

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example, the net collateral taker transfers them between different in-house accounts. If the new derivatives dealer stands as a counterparty to the net collateral provider under a mirroring derivative transaction, the parties may simply decide to set-off their obligations.

[96] According to Duffie, during the 2007-08 crisis, dealer banks displayed seemingly self-damaging behaviour with the intention of defending their reputation. See Duffie (ch 2, n 32) 65. For example, by bringing asset-backed securities onto their balance sheet, by supporting internal hedge funds, and, indeed, by agreeing to the novation of swap agreements. See ibid 54–60. For a specific example of hedge funds that sought to novate their swap agreements to reduce their exposures to Bear Sterns, see Financial Crisis Inquiry Commission (n 33) 287–88.

[97] With a haircut of 3%, C would only be expected to hold securities worth £103m. Under the previous haircut of 5%, it was holding securities worth £105m. B could request that C returned the difference between those two amounts. Alternatively, B could even seek to reduce the Repurchase Price, e.g. to £100m. That would effectively increase the collateral taker's over-collateralisation, and thus B's unsecured claim, by £1m. Because B's claim would now be for £5m, it would increase B's chances of recovering the £4m that it was owed under the original terms of the repo. Nevertheless, given the low rate of recovery for unsecured creditors, B would probably treat this as a last resort option.

take time, but one would also expect the collateral taker to oppose such an agreement vehemently. Alternatively, B could seek to substitute the posted collateral for collateral of greater quality, which typically carries a lower haircut. Yet, B might not be willing to compromise its high-quality collateral, particularly if it can expect to suffer some losses as a result of C's potential insolvency. In addition, B could even attempt to reduce its credit exposure to C by borrowing cash from it on an unsecured, or, at least, under-collateralised basis.[98]

Under the swap transaction, C too could seek a similar reduction in the applicable haircut from D, or seek to substitute the securities portfolio with securities of a higher quality and thus a lower haircut. C could also seek to borrow cash from D, or to enter into new trades with D that would cause the latter to pay out cash for a derivatives position.[99] Similarly, C could seek to collect any money due under those derivatives positions where it is in-the-money.[100] But more importantly, C could seek to reduce its initial margin obligation; e.g., from £105m to £50m. Alternatively, C could seek to impose an initial margin requirement on D, particularly if the latter's creditworthiness were under pressure. As described in the previous paragraph in relation to repos, these possibilities would have to have been included in the ENG CSA. Otherwise, we could expect D to oppose such modifications vehemently, particularly if it really were under liquidity pressure.

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[98] Indeed, it is not uncommon for firms to tap their lines of credit in anticipation of turbulent times. For example, recent academic studies have observed that, during the 2007-08 financial crisis, many firms increased their drawings under lines of credit in fear that banks might restrict credit in the future. See e.g. Murillo Campello, John R Graham and Campbell R Harvey, 'The Real Effects of Financial Constraints: Evidence from a Financial Crisis' (2010) 97 Journal of Financial Economics 470; Victoria Ivashina and David Scharfstein, 'Bank Lending during the Financial Crisis of 2008' (2010) 97 Journal of Financial Economics 319.

[99] See Duffie (ch 2, n 32) 65.

[100] See ibid.

The third way in which B and C, as collateral providers, could seek to reduce their credit exposure to their respective collateral takers is by requesting the latter to transfer the securities portfolio into a segregated account.[101] This option would only be available to B and C if their respective collateral takers were holding the collateral assets comingled with their own assets. The collateral assets could be transferred into an omnibus account, where the assets would be commingled with other assets received from other counterparties, or to an individually segregated account, where the assets would be segregated from those of any other counterparty and from those of the collateral taker herself.[102] If the collateral taker no longer held the securities portfolio in her own account, or in an account under her control, e.g. because she had re-used the assets, it is difficult to imagine how such segregation could be accommodated. Even if segregation were still possible, its actual implementation would require a complex negotiation to modify the relevant financial collateral arrangements. As expressed above in relation to the first run mechanism, we can reasonably expect the collateral takers to oppose these modifications vehemently; particularly if the portfolio had been re-hypothecated, for example, to support an onward transaction.[103] As described in relation to the second run mechanism, however, reputational concerns might reduce the incentives of collateral takers to oppose these modifications.

[101] For an example in the context of prime brokerage services, see ibid. Indeed, between August and November of 2008, the major securities dealers in the U.S. saw the level of their client's securities that they had available for re-use decline dramatically, between 30% and 69%. See Manmohan Singh and James Aitken, 'Devleveraging after Lehman—Evidence from Reduced Rehypothecation' (2009) IMF Working Paper no. 09/42 6.

[102] For a more detailed analysis of segregation practices in OTC derivatives markets, see Chapter 3.

[103] In this case, the collateral taker might still hold the securities portfolio in her own account, but the account would be under the control of an onward collateral taker.

Lastly, if their respective collateral takers were in a dire financial situation and very close to insolvency, B and C could seek to call an "Event of Default"[104] under the relevant master agreement to terminate their transaction and to enforce the close-out netting mechanism. In the case of the swap transaction, the liquidity pressure upon the collateral taker (D) could go beyond the need to return equivalent collateral to the collateral provider (C) as the latter would also be entitled to the replacement cost of the derivatives positions it holds.[105] However, as evidenced by the collapse of Lehman Brothers, anticipating a firm's filing for bankruptcy can be very difficult.

This analysis shows how B and C, as collateral providers, might run from their respective collateral takers, C and D. It also shows how C, as a collateral re-user, will stand in a particularly vulnerable position. If B, and many other collateral providers like it, changed their expectations about the solvency of C and attempted to reduce their credit exposure within a short period of time, their behaviour could put considerable liquidity pressure on C and could potentially lead to the self-fulfilment of their expectations about C's insolvency. If C were to file for insolvency, there could be implications for systemic risk. For example, C's insolvency could trigger contagion effects in the form of direct losses to its counterparties, information contagion effects, and irrational behaviour. Moreover, C's insolvency could be a source of systemic risk if some of its creditors attempt to liquidate collateral assets in a disorderly manner, potentially leading to liquidation at fire sale prices. Finally, C's

[104] In relation to the swap transaction, see ISDA, 'ISDA MA' (ch 2, n 25) 5(a), 6. In relation to repos, see ICMA and SIFMA (ch 1, n 87) 10(a).

[105] The net collateral provider would seek quotations from other derivatives dealers to replace the derivatives positions that have been terminated. Dealers offer one price to buy and a higher price to sell. 'This bid–offer spread implies an effective transaction cost that increases the replacement cost of the derivatives portfolio and thus raises the claim against the defaulting dealer.' Duffie (ch 2, n 32) 66.

insolvency could affect the ability of the financial system to provide risk management functions to the real economy.

As C attempts to meet its obligations with its collateral providers and seeks to source equivalent collateral assets, it can impact the price of these assets and accentuate asset value contagion effects. Additionally, if C attempts to source these assets by reducing its credit exposure to onward collateral takers along a chain such as D, this could expose the latter to considerable liquidity pressure, particularly if these onward collateral takers had re-used the collateral assets themselves. As an increasing number of re-users along the chain react to this systemic run, their behaviour could help spread the risks identified in the previous paragraph across wider sections of the financial system.

# V. Conclusion

Recent academic studies illustrate how run behaviours may have contributed to the unravelling of the financial crisis in 2007 and 2008. These run behaviours were particularly present in short-term debt markets such as repos and ABCP, where collateral takers sought to reduce their credit exposure as market confidence declined. A few academic studies also suggest that institutional clients may have run from ailing derivatives dealers in the OTC derivatives market. None of these studies, however, examines the role that collateral re-use might play in the development of such run behaviours. In this Chapter, I have aimed to fill that very gap.

In the aftermath of the 2007-08 financial crisis, international bodies such as the FSB, the BCBS and IOSCO have raised concerns about asset value contagion and runs as sources of systemic risk in SFTs and OTC derivatives markets. They have also expressed some concerns with the collateral taker's right to re-use. Yet,

these latter concerns are rather timid and fail to provide a detailed explanation of how collateral re-use might contribute to systemic risk. For example, no connection is made between concerns about asset value contagion and run risks, and the collateral taker's right to re-use, which I have explored in this and the previous Chapter. Nevertheless, these international bodies have adopted a series of regulatory initiatives that aim, precisely, at containing systemic risk in these markets. Some of the regulatory proposals will affect the way participants in SFTs and OTC derivatives markets re-use collateral. In the next chapter, I will describe these regulatory proposals in detail and will examine the extent to which they address the concerns of collateral re-use as a source of systemic risk, as expressed in this Chapter and the previous one.

# Chapter 7. What Should We Do about Collateral Re-use?

## I. Introduction

In the previous two Chapters, I explored the possible systemic risks of re-using securities collateral in SFTs and in OTC derivatives markets. In Chapter 5, I described how collateral re-use multiplies the number of claims that will depend on the market value of the same collateral asset. I also described how this multiplication effect can amplify asset value contagion: by increasing the number of claims that will depend on changes in the price of an asset, collateral re-use can exacerbate pressure on that asset's price. This multiplication effect can also magnify portfolio effects: when the number of market participants holding those claims is greater, the range of assets that they can liquidate to meet margin calls will be broader. These amplification effects could trigger new margin calls in the same or different markets, thereby aggravating asset value contagion. They could also increase the probability of a single firm becoming insolvent and the systemic risks associated with it.

In Chapter 6, I described how granting the collateral taker a right to re-use would effectively lead the collateral provider to relinquish its proprietary interest in the collateral assets. This transformation of the collateral provider's rights would leave it with an unsecured claim against the collateral taker for the return of the same or equivalent assets. When the collateral taker is over-collateralised, the application of close-out netting mechanisms will still leave the collateral provider with an

unsecured claim for any over-collateralised amount. If the former is nearing the brink of insolvency, the latter will have a strong incentive to reduce its credit exposure before the former files for insolvency to avoid standing as an unsecured creditor in the insolvency proceedings.

Collateral re-use can give collateral providers additional motivations to run. For example, the more that the collateral taker re-uses collateral received from its counterparties, the greater the number of potentially unsecured collateral providers, who will stand as unsecured creditors over the collateral taker's estate. Nevertheless, at the moment, unsecured creditors cannot assess the effect that collateral re-use will have on the collateral taker's balance sheet and, if faced with uncertainty, we can reasonably expect them to conclude that their pro rata share over the insolvent estate will decrease. This will accentuate the incentives of unsecured creditors to run. If collateral providers are facing their own liquidity problems, they may seek to recover posted collateral assets, particularly if these are of a high quality, thereby putting additional liquidity pressure on the collateral taker. A combination of information asymmetries and coordination problems between collateral providers could force the collateral taker to file for insolvency, thereby fulfilling the formers' own expectations. Under certain circumstances, such an insolvency could undermine financial stability.

In the aftermath of the 2007-08 financial crisis, national and international financial regulators have concentrated their efforts in containing systemic risk. In the SFTs market, the FSB has played a leading role.[1] In a report that was published on

[1] The FSB is an international body 'that monitors and makes recommendations about the global financial system'. FSB, 'About the FSB' <http://www.fsb.org/about/> accessed 2 January 2017. Chris Brummer describes it as one of the two "international agenda setters", together with the Group of Twenty (G-20), a forum for the twenty largest advanced and emerging economies, including nineteen countries and the E.U. See Chris Brummer, *Soft Law and the Global Financial System: Rule Making Inthe 21st Century* (Cambridge University Press 2012) 72–74. The Plenary is the sole decision-

29 August 2013, the FSB identified the main sources of systemic risk in SFTs and made a series of policy recommendations to minimise those risks.[2] Collateral re-use was among such sources. In particular, the FSB identified three main sources of systemic risk: i) cash collateral re-investment practices, ii) clients' uncertainty 'about the extent to which their assets have been re-hypothecated, or about the treatment in case of bankruptcy', and iii) interconnectedness arising from collateral chains.[3] In addition, the FSB expressly referred to the risk of runs such as those described in Chapter 6 as a potential consequence of the second element in that list.[4] The report, however, did not provide any detailed analysis of such potential run behaviour.

In the case of OTC derivatives, the only recommendations to revisit the regulation of collateral re-use have been made in relation to bilaterally cleared derivatives. These are included in a policy framework that the BCBS[5] and the IOSCO[6] published in March 2015, which establishes minimum standards for margin

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making body of the FSB. It consists of '54 representatives from 25 jurisdictions [including all of the G-20], six representatives from four international financial institutions and nine representatives from six international standard-setting, regulatory, supervisory and central bank bodies'. FSB, 'Organisational Structure and Governance' (*About the FSB*) <http://www.fsb.org/about/organisation-and-governance/> accessed 2 January 2017. The FSB's mandate is to promote financial stability. '[I]t does so by coordinating national financial authorities and international standard-setting bodies as they work toward developing strong regulatory, supervisory and other financial sector policies. It fosters a level playing field by encouraging coherent implementation of these policies across sectors and jurisdictions.' FSB, 'About the FSB'. For an analysis of how the FSB interacts with the G-20 and other international bodies and domestic authorities, see Stavros Gadinis, 'The Financial Stability Board: The New Politics of International Financial Regulation' (2012) 48 Texas International Law Journal 157.

[2] See FSB, 'Strengthening Oversight and Regulation of Shadow Banking. Policy Framework for Addressing Shadow Banking Risks in Securities Lending and Repos' (ch 1, n 63).

[3] See FSB, 'Strengthening Oversight and Regulation of Shadow Banking. Policy Framework for Addressing Shadow Banking Risks in Securities Lending and Repos' (ch 1, n 63) 4–6.

[4] See ibid 5.

[5] The BCBS is 'the primary global standard setter for the prudential regulation of banks and provides a forum for cooperation on banking supervisory matters.' BIS, 'About the Basel Committee' (*Basel Committee on Banking Supervision*, 30 December 2016) <https://www.bis.org/bcbs/about.htm?m=3%7C14%7C573> accessed 2 January 2017. International standard setters are in charge of devising standards for the ultimate adoption by national authorities and regulators. See Brummer (n 1) 74.

[6] IOSCO is an international standard setter for the securities sector. See Brummer (n 1) 77. It gathers the world's securities regulators, and it 'develops, implements and promotes adherence to

requirements in these products.[7] Like the FSB, the BCBS and IOSCO raised some concerns with collateral re-use. Their concerns, however, were not directly related to the implications of collateral re-use as a potential source of systemic risk, but rather as a factor that could undermine the effectiveness of the new and stricter initial margin requirements.[8]

The regulatory recommendations included in these policy frameworks will have a considerable impact on how collateral is re-used in these markets. This Chapter examines these policy recommendations, as well as the specific regulations that implement them in the U.K. and the U.S. I will evaluate how well these regulatory reforms address the risks identified in Chapters 5 and 6, even if unintentionally, and, to the extent possible, I will make recommendations about how regulators in the U.K. and the U.S. might improve their initiatives to contain systemic risk arising from the re-use of securities collateral in SFTs and OTC derivatives markets. For the sake of discussion, the analysis of the different regulatory strategies that I present in this Chapter relies on the normative assumption that financial regulators will make financial stability a priority objective.[9]

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internationally recognized standards for securities regulation'. IOSCO, 'About IOSCO' <https://www.iosco.org/about/?subsection=about_iosco> accessed 2 January 2017.

[7] See BCBS and IOSCO (ch 1, n 63).

[8] In this sense, the BCBS/IOSCO policy framework regarded the re-use of initial margin as a source of additional credit risk for the collateral provider. See ibid 19.

[9] The examination of the precise normative role that financial stability ought to hold is a fascinating question, yet one I cannot address in the remainder of this dissertation. Nevertheless, in the aftermath of the 2007-08 financial crisis, this assumption is quite realistic. After the recent episodes of instability in global financial markets, financial stability has become an evident concern for financial regulators across the world. For example, in the U.K., financial stability is now a statutory objective of the Bank of England. See Banking Act 2009, s 238(1). See also Bank of England Act 1998, s 2A, 9A-9ZA. Moreover, the Financial Services Act 2012 created a new macro-prudential regulator, the Financial Policy Committee (FPC), whose main function was to contribute 'to the achievement by the Bank of the Financial Stability Objective'. See Financial Services Act 2012, s 4. The FPC substituted the Financial Stability Committee that had been created by Section 238 of the Banking Act 2009. In the U.S., Title I of the Dodd-Frank Act has buttressed the importance of financial stability as a policy concern by creating new regulatory and oversight bodies in charge of monitoring systemic risk. For example, it has created a new macro-prudential authority: the Financial Stability Oversight Council (FSOC). The main purpose of the FSOC is to identify risks to the financial stability of the U.S. and to

Section II examines in detail the advantages and disadvantages of the different strategies that international bodies, and national and regional regulators, have adopted to contain systemic risk from the re-use of securities collateral. This analysis will allow me to identify the extent to which these regulatory initiatives address the concerns that I raised in Chapters 5 and 6. Section III looks ahead to identify possible ways in which regulators could further reduce systemic risk from collateral re-use without increasing the costs. Section IV provides a summary of the main conclusions of the dissertation and points at some of the questions that the dissertation opens for further academic enquiry.

# II. Where do we stand?

## A. Reducing the amplification of AVC effects

### 1. Reducing the probability of AVC occurring in the first place

In the aftermath of the 2007-08 financial crisis, international bodies have identified asset value contagion as a potential threat to the stability of securities financing and OTC derivatives markets.[10] These bodies, as well as national and regional regulators, have introduced, or will soon introduce, regulatory reforms that aim at containing these contagion effects. For example, regulators will be introducing haircut floors to

respond to emerging threats to that stability. See Dodd-Frank Act, s 112(1). The Act also establishes a new Office of Financial Research (OFR) whose main purpose is to support the FSOC in fulfilling its purposes, as well as supporting member agencies, by collecting data and developing tools and research to measure and monitor risk. See Dodd-Frank Act, s 153.

[10] See Bouveret and others (ch 5, n 57) 5; FSB, 'Strengthening Oversight and Regulation of Shadow Banking. Policy Framework for Addressing Shadow Banking Risks in Securities Lending and Repos' (ch 1, n 63) 5. See also BCBS and IOSCO (ch 1, n 63) 3; Office of Financial Research, 'Financial Stability Report' (2015) 108–109.

improve the capacity of posted collateral to absorb losses.[11, 12] Haircut floors can also contribute to the reduction of procyclicality in margins.[13] In principle, these haircut floors will help contain margin spirals when asset prices rise in prosperous times, and they will also help avoid abrupt increases in haircuts during stress times.

In addition, regulators will also aim to reduce margin procyclicality by improving collateral practices. Traditionally, the frequency with which posted collateral was valued in OTC derivatives varied substantially depending on the counterparty.[14] In March 2015, however, the BCBS and IOSCO proposed that variation margin in bilaterally cleared derivatives be calculated and exchanged at least on a daily basis,[15] and that the full amount necessary to fully collateralise the mark-to-market exposure be exchanged.[16] Regulators in the E.U. and the U.S. have

[11] For example, if a particular portfolio of securities collateral has a haircut of 5%, the collateral taker will be able to rely on that portfolio to cover any unexpected losses up to 5% of the indebted amount. One example of such unexpected loss might be the drop in the market value of the portfolio, which may affect the ability of the collateral taker to rely on that portfolio to satisfy her claim, even if the parties had agreed on full collateralisation.

[12] In relation to SFTs, see e.g. FSB, 'Transforming Shadow Banking into Resilient Market-Based Finance. Regulatory Framework for Haircuts on Non-Centrally Cleared Securities Financing Transactions' (2015). Regulators in the E.U. and the U.S. are yet to propose specific plans for the implementation of haircut floors in SFTs. In the context of OTC derivatives, the BCBS and IOSCO have proposed haircut floors for bilaterally cleared derivatives. See e.g. BCBS and IOSCO (ch 1, n 63). The standards refer to different methods for determining appropriate haircuts; mainly: risk-sensitive quantitative models, both internal or third-party, or standardised haircuts. Appendix B includes a table of standard haircuts that is based on Basel II standard supervisory haircuts. See ibid 18. For a detailed discussion of these methods, see ibid 17–19. Regulators in the E.U. and the U.S. have adopted similar frameworks. In the E.U., see EMIR, arts 11(3), 15(a), 46(1) and 46(3)(b). See also CDR 2016/2251, Annexes II and III. In the U.S., see Margin and Capital Requirements for Covered Swap Entities – Final Rule, November 30, 2015, 80 Fed. Reg. 74840 ("PR final rules"), Appendix B; Margin Requirements for Uncleared Swaps for Swap Dealers and Major Swap Participants – Final Rule, January 6, 2016, 81 Fed. Reg. 636 ("CFTC final rules"), s 23.156(a)(3).

[13] In this context, the term "procyclicality" refers to 'the tendency of financial variables to fluctuate together with the economic cycle'. FSB, 'Securities Lending and Repos: Market Overview and Financial Stability Issues' (ch 2, n 29) 15.

[14] For a detailed analysis of common margin practices in bilaterally cleared derivatives, see Chapter 3, Section II.

[15] See BCBS and IOSCO (ch 1, n 63) 15.

[16] See ibid.

recently adopted these recommendations,[17] and the new regulatory requirements will enter into force on 1 March 2017 at the latest.[18] These new regulatory requirements will increase the frequency with which the value of assets is marked to market and, thus, the frequency of margin calls. Albeit more frequent, the resulting margin calls will be of smaller amounts provided that exposures are indeed fully collateralised, which, in principle, will reduce the liquidity pressure from sudden and larger margin calls. The FSB has proposed similar requirements in relation to SFTs,[19] but as of December 2016, they were yet to be implemented in the U.S. and the E.U.

Moreover, regulators in the E.U. and the U.S. have also introduced, or will soon introduce, exemptions to some of the bankruptcy safe harbours for SFTs and OTC derivatives examined in Chapter 4. For example, the BRRD[20] precludes the designation of any early intervention as an enforcement event,[21] it overrides the early termination rights of the non-defaulting party,[22] and it restricts the latter's ability to enforce collateral by introducing very short automatic stays.[23] These regulatory measures seek to allow liquidation authorities enough time to transfer an insolvent

[17] In the E.U., EMIR had already introduced similar requirements a few years earlier. See e.g. EMIR, arts 11(2), 11(3), 41(3).

[18] In the E.U., these new requirements will enter into force on 4 February 2017. See Commission Delegated Regulation (EU) 2016/2251 ("CDR 2016/2251") [2016] OJ L 340/9, arts 9(1), 10, 12, 37. In the U.S., these new requirements will enter into force on 1 September 2016 for larger participants, and on 1 March 2017 for any participant. See PR final rules, ss _.1(e), _.4; CFTC final rules, ss 23.153, 23.161(1), (2).

[19] See FSB, 'Strengthening Oversight and Regulation of Shadow Banking. Policy Framework for Addressing Shadow Banking Risks in Securities Lending and Repos' (ch 1, n 63) 17.

[20] Directive 2014/59/EU of the European Parliament and of the Council of 15 May 2014 (the Bank Recovery and Resolution Directive, or "BRRD") [2014] OJ L 173/190.

[21] See BRRD, art 68(3)(b).

[22] See BRRD, art 71.

[23] See BRRD, art 70. The BRRD might affect other insolvency law safe harbours given the broad powers that it confers upon resolution authorities to guarantee the effective application of the different resolution tools. See BRRD, arts 63, 64. In the U.S., see Dodd-Frank Act, ss 205(b)(4), 210(c)(10)(B).

firm's SFTs or derivatives portfolio to other market participants.[24] In principle, this would prevent the insolvent firm's counterparties from realising collateral assets immediately upon the former's filing for insolvency, and would thereby reduce the potential contagion effects arising from post-default fire sales.

Table 7.1 provides a summary of the main regulatory strategies that seek to address asset value contagion after the 2007/08 financial crisis, and their potential effects on collateral re-use.

Table 7.1. Reducing the probability of AVC: regulatory strategies

| Reform | Market scope | E.U. | U.S. | Effect on re-use |
|---|---|---|---|---|
| Haircut floors | SFTs | Pending | Pending | Reduce margin procyclicality |
| | Bilaterally cleared ("B.c.") derivatives | EMIR, arts 11, 15, 46; CDR 2016/2251, Annexes II, III | PR final rules, Appendix B; CFTC final rules, s 23.156(a)(3). | |
| Daily valuation | SFTs | Pending | Pending | Reduce margin procyclicality |
| | B.c. derivatives | EMIR<br>CDR 2016/2251, arts 9(1), 10, 12 | PR final rules, s _.4, CFTC final rules, s 23.153. | |
| Short automatic stays | SFTs | BRRD, arts 63, 64, 68-71 | Dodd-Frank, ss 210(c)(8)(D), 210(c)(10)(B) | Avoid post-default fire sales |
| | B.c. derivatives | | | |

Regulators expect these three regulatory strategies –haircut floors, more frequent valuation, and exemptions to bankruptcy safe harbours– to contain asset

[24] See e.g. BRRD, art 86(3); FCD, arts 1(6), 9(a). In the U.S., regulators are currently working on the implementation of such automatic stays. See e.g. Yellen (ch 6, n 5). In the U.S., a longer automatic stay could be applied if the Securities Investor Protection Corporation (SIPC) were to file an application for a protective decree with the competent court. See SIPA, ss 5(a), 5(b)(2)(C)(ii). In addition, the FSB has encouraged the development of contractual approaches to cross-border resolution to complement statutory frameworks. See e.g. FSB, 'Principles for Cross-Border Effectiveness of Resolution Actions' (2015). In this sense, in the context of OTC derivatives, ISDA has developed the ISDA 2015 Universal Resolution Stay Protocol, 'which enables parties to […] contractually recognize the cross-border application of special resolution regimes applicable to certain financial companies until comprehensive statutory regimes are adopted'. See ISDA, 'ISDA 2015 Universal Resolution Stay Protocol' (*ISDA*) <https://www2.isda.org/functional-areas/protocol-management/protocol/22> accessed 7 August 2016.

value contagion effects. Nevertheless, there are several reasons to be sceptical about the effectiveness of these strategies.

First, haircut floors might prevent margin spirals when the price of collateral assets rises, but haircut floors will not prevent margin spirals if asset prices decline or if their credit rating is downgraded. Indeed, as illustrated by Gorton and Metrick in the context of bilateral repo markets, haircut increases can lead to severe financial stress.[25]

Moreover, the logic that more frequent valuations of OTC derivatives positions and of the collateral assets posted to secure those positions will reduce procyclicality is not undisputed. According to Domanski et al, "high frequency margining", i.e. the ability of market participants to make more than one margin call on the same contract during the day, could have the opposite effect.[26]

Finally, there are several uncertainties that could affect the efficacy of exemptions to safe harbour provisions in reducing asset value contagion. For example, liquidation authorities may not be able to transfer the insolvent firm's portfolios within the short time window given:[27] they may face operational difficulties in transferring big portfolios, and other market participants may be unwilling or unable to receive the insolvent institution's portfolio in bulk. Until a large market participant becomes insolvent, the effectiveness of these provisions will remain an open question.

In addition to these challenges, the amplification effect that collateral re-use can have on asset value contagion, as described in Chapter 5, could cast further

[25] See Gorton and Metrick (ch 6, n 53).

[26] In the context of centrally cleared OTC derivatives, see Domanski, Gambacorta and Picillo (ch 2, n 2) 72.

[27] Resolution authorities in the E.U. and the U.S. have the power to suspend termination rights for one business day. See Dodd-Frank Act, s 210(c)(10)(B); BRRD, art 71.

doubts on the efficacy of these measures. The following sub-sections explore whether other regulatory proposals manage to contain this amplification effect.

## 2. Reducing the amplification effect of collateral re-use

Some of the main regulatory proposals for the SFT and OTC derivatives will have an impact on the amplification effect of collateral re-use. In particular, international bodies have proposed a series of regulatory measures that will restrict the multiplication effect of collateral re-use, either directly or indirectly. Although the latter were at the core of the recommendations proposed by the international bodies, regulators in the E.U. and the U.S. focused their attention mainly on the former, as I shall describe. Nevertheless, proposed indirect restrictions remain important for our purposes: as part of the policy framework proposed at the international level, they are essential to understand the rationale behind the implementation of that framework at the national level. For the sake of clarity, I shall therefore examine indirect restrictions first, and then direct restrictions.

### *a. Indirect restrictions on collateral velocity*

In its August 2013 report, the FSB made a series of recommendations that restrict the re-use of collateral in SFTs markets to intermediation purposes only: i) that only financial intermediaries would be allowed to reuse clients' assets; and ii) that financial intermediaries would only be allowed to re-use clients' assets 'for the purpose of financing client long positions and covering short positions, but they should not be [re-used] for the purpose of financing the intermediary's own-account

activities'.[28] As of December 2016, regulators in the U.K. and the U.S. were yet to implement any of these recommendations. When that happens, we can expect changes in the relevant standard documentation to comply with these indirect restrictions.

Like the FSB recommendations for SFTs, the BCBS/IOSCO policy framework for bilaterally cleared derivatives recommends a functional restriction of collateral re-use. In particular, the BCBS and IOSCO recommend that a customer's assets are only re-used 'for the purpose of hedging the initial margin collector's derivatives position arising out of transactions with the customer in relation to which the collateral was provided'.[29] This restriction suggests that, in essence, only derivatives dealers will be allowed to re-use collateral received as initial margin in their role as market makers, i.e. as derivatives intermediaries. In principle, derivatives dealers will not be permitted to re-use collateral collected in inter-dealer derivatives transactions.[30]

It is important to note that the restriction will only apply to collateral assets collected as initial margin. Traditionally, participants in bilaterally cleared derivatives markets exchanged initial margin on a unilateral basis, or they did not exchange it at all.[31] However, in March 2015, the BCBS and IOSCO proposed that

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[28] FSB, 'Strengthening Oversight and Regulation of Shadow Banking. Policy Framework for Addressing Shadow Banking Risks in Securities Lending and Repos' (ch 1, n 63) 16. The original recommendation refers to "re-hypothecation". However, by re-hypothecation, the FSB understands the broad re-use, as defined in this dissertation, of clients' assets by a financial intermediary. See e.g. ibid 15.

[29] BCBS and IOSCO (ch 1, n 63) 21. The original statement uses the term "re-hypothecation. However, the BCBS and IOSCO seem to use this term in the broader sense of "re-use". See ibid.

[30] According to the BCBS and IOSCO, the term "customer" 'should only include "buy-side" financial firms as well as non-financial entities, but shall not include [derivatives dealers].' BCBS and IOSCO (ch 1, n 63) 21.

[31] For a detailed analysis of common margin practices in the bilaterally cleared derivatives market, see Chapter 3, Section II.

initial margin be posted bilaterally and on a gross basis.[32] These recommendations have been recently implemented in the U.S.[33] and in the E.U.[34] These initial margin requirements entered into force on 1 September 2016, but they will be applied to different market participants on a progressive basis depending on the size of their derivatives portfolios.[35] Their full implementation is expected on the 1st September 2020.[36] The industry expects these new initial margin requirements to change the bilaterally cleared derivatives market dramatically as numerous market participants who might have otherwise never been required to post initial margin by their counterparties start to face this type of demands.[37]

These recommendations can restrict collateral velocity, albeit in an indirect manner: they limit the type of market participants that can rely on collateral re-use, and the purposes for which these participants may re-use collateral.[38] Since collateral can only be re-used for intermediation purposes, collateral chains can only be as long as the number of intermediaries that are engaged consecutively. In the context of repos, intermediation is normally a one-step process. For example, a dealer bank would be allowed to re-use its client's securities collateral to raise finance for its client under a repo. However, it would not be permitted to re-use that collateral to

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[32] See BCBS and IOSCO (ch 1, n 63) 20.

[33] See PR final rules, s _.3; CFTC final rules, s 23.152.

[34] See CDR 2016/2251, Recital (7), Annex IV.

[35] Their implementation will be phased in, these requirements being applicable to larger firms as early as the 1st September 2016. See PR final rules, s _.1(e); CFTC final rules, s 23.161. In the E.U., these requirements will enter into force for larger firms on 4 January 2017. See CDR 2016/2251, arts 36, 37.

[36] See ibid.

[37] On the 1 March 2017, these initial margin requirements will be applicable to some of the largest customers of banks, including asset managers, financial services companies, pension funds and large corporations. Scott O'Malia, chief executive of ISDA, has described the 1 March deadline as "the big bang" for the industry. See Stafford and Brunsden (ch 3, n 37).

[38] Some commentators, however, have criticised that the functional restriction proposed by the BCBS and IOSCO is unclear about the type of hedging that the collateral taker will be allowed to re-use the collateral for. See Yeowart and Parsons (ch 1, n 62) 22.93.

raise finance for its own activities. Nor would the repo lender that received the securities collateral from the dealer bank be permitted to re-use the collateral. In bilaterally cleared derivatives, derivatives dealers are the main market makers and thus stand at the heart of the market. Because derivatives dealers will not be allowed to re-use collateral received in inter-dealer transactions under the proposed BCBS/IOSCO policy framework, collateral chains will *de facto* have a collateral velocity of 1.[39]

The main advantage of these indirect restrictions of collateral velocity is that they will restrict the multiplication effect and therefore mitigate the amplification of any potential asset value contagion effects. They will also reduce the probability that collateral re-use will frustrate the efficacy of recent regulatory proposals that aim at mitigating procyclicality and post-default fire sales, as described in Section III.A.1. In addition, restricting the purpose of re-use to financial intermediation will eliminate the possibility of collateral chains spanning different markets, e.g. as a result of re-using repo collateral to meet initial margin obligations under an OTC derivative contract, or vice versa. This will contribute to reducing cross-sectorial risks. More importantly, by permitting the re-use of collateral to fulfil intermediation services, these restrictions will not impair the ability of SFTs markets to provide a core function to the real economy: the allocation of excess cash and securities between different parts of the financial system; nor will they prevent derivatives dealers from continuing to stand as market makers in bilaterally cleared derivatives providing a risk management function.

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[39] If derivatives dealers were allowed to re-use collateral received from another dealer collateral chains could be much longer: each of the two dealers (A and B) in an inter-dealer swap could re-use received initial margin to collateralise a hedging transaction with another dealer (C and D, respectively). In turn, C and D could then each seek to re-use the received initial margin to collateralise their respective hedging transactions. The hypothetical could be carried forward until one of the dealers hedges its exposure by entering into a derivatives transaction with a non-dealer counterparty.

One evident disadvantage of reducing collateral velocity, albeit indirectly, will be the reduction in the circulation of collateral. This reduction could lead to three problems. First, some commentators have argued that a reduction in the velocity of collateral would hinder the ability of market participants to comply with increasingly large margin obligations; e.g., as CCPs require that market participants post initial and variation margin in centrally cleared OTC derivatives markets, and as a result of stricter margin requirements in bilaterally cleared derivatives.[40] One of the possible ways in which market participants might react to such collateral shortages is by relying on financial innovation to avert the problem, which may give rise to new forms of systemic risk.[41]

These arguments, however, are not undisputed. Some academic studies challenge the existence of a collateral shortage. For example, Duffie and Zhu argue that requiring OTC derivatives to be cleared through CCPs can actually reduce the aggregate demand for collateral, not increase it.[42] Moreover, other commentators defend that a reduction in the size of SFTs markets, like the one that could result from a reduction in collateral velocity, would see central banks stepping in to compensate for any possible drop in market activity.[43]

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[40] See e.g. Singh, 'Velocity of Pledged Collateral: Analysis and Implications' (ch 2, n 15) 18.

[41] A similar process of financial innovation, spurred by a great demand for investment securities, led to the development of residential mortgage backed securities (RMBS). See e.g. Bengt Holmstrom, 'Understanding the Role of Debt in the Financial System' (2014) 29–31. Arguably, a continuously increasing demand for RMBS incentivised a reduction in market standards, which eventually led the U.S. subprime mortgage market to collapse. See e.g. Financial Crisis Inquiry Commission (ch 6, n 33) xxii–xxiv.

[42] See Duffie and Zhu (ch 3, n 22) 75–76. Similarly, see Domanski, Gambacorta and Picillo (ch 2, n 2).

[43] See e.g. Perry Mehrling and others, 'Bagehot Was a Shadow Banker: Shadow Banking, Central Banking, and the Future of Global Finance' (2013) <https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2232016>. An intervention of this sort, however, will require the central bank to expand its balance sheet, sometimes manifold. A deterioration of the assets held in the central bank's balance sheet could expose the central bank to considerable losses. The central bank's attempt to compensate these losses by, for example, printing money, could have undesirable social costs in the form of deflation.

Second, reducing the circulation of collateral could hinder the development of some of the positive externalities associated with collateral re-use. For example, defendants of a privileged treatment of repos in bankruptcy could argue that a lower velocity of collateral could erode market liquidity. In Chapter 4, I described how the regulatory rationale behind the protection of collateral re-use relied on the role of collateral re-use in promoting market liquidity; in particular, that an express or implicit right to re-use would support market-making activities, and that it would enable short selling.

This liquidity argument may be better framed in terms of core functions. Indeed, some commentators have argued that restricting collateral velocity could increase transactions costs for market makers as they may not be able to re-use received collateral to meet their own collateral obligations.[44] As a result of these higher transaction costs, we might see a reduction in the size of securities financing and bilaterally cleared derivatives markets.[45] By reducing the size of SFTs markets, which play an important role in wholesale funding, a reduction in collateral velocity could reduce the potential for credit and economic growth. Those commentators could make a similar argument in relation to bilaterally cleared derivatives: if using derivatives to hedge transactions becomes more costly, a restriction on collateral velocity could thwart credit and economic growth.

This final point is well taken. Nevertheless, the availability of alternative funding and hedging products can mitigate the impact on credit and economic growth. For example, repo borrowers might decide to rely on more traditional forms of finance such as secured loans. Similarly, participants in bilaterally cleared

[44] See e.g. Yeowart and Parsons (ch 1, n 62) 22.93.

[45] Indeed, the same commentators argue that we should expect intermediaries to pass on the resulting additional costs to clients. See ibid.

derivatives markets might choose to enter into standardised derivative contracts or bespoke insurance contracts instead. It is important to note, however, that if the velocity of collateral is restricted, the total levels of credit and risk management through derivatives will inevitably decline because the same collateral asset will support a limited number of transactions. Indeed, these alternatives can mitigate, rather than eliminate, the impact on credit and economic growth. In their quest to reduce systemic risk, regulators should aim to mitigate the adverse consequences.

*b. Direct restrictions on collateral velocity*

In addition to those indirect restrictions, the BCBS and IOSCO proposed the adoption of direct constraints on collateral velocity for bilaterally cleared derivatives. They recommended that collateral assets collected as initial margin be re-used only once: by the original collateral taker.[46] In other words: that collateral velocity is expressly restricted to 1.

Regulators in the E.U. and in the U.S., however, have gone a step beyond and have imposed a complete ban on the re-use of securities collateral collected as initial margin. In the E.U., the Commission Delegated Regulation (EU) 2016/2251 of 4 October 2016 ("CDR 2016/2251") stipulates that the collateral taker 'shall not rehypothecate, repledge nor otherwise reuse the collateral collected as initial margin'. [47] Furthermore, the European Securities Markets Authority (ESMA)

[46] See BCBS and IOSCO (ch 1, n 63) 21.

[47] CDR 2016/2251, art 20(1). Such restriction is grounded on the desire to avoid legal complications as a result of potential 'claims of third parties over the [collateral] assets in the event of a default.' CDR 2016/2251, Recital (35). European Commission, 'Delegated Regulation (EU) Supplementing Regulation (EU) No 648/2012 of the European Parliament and of the Council on OTC Derivatives, Central Counterparties and Trade Repositories with Regard to Regulatory Technical Standards for Risk-Mitigation Techniques for OTC Derivative Contracts Not Cleared by a Central Counterparty' 11 <http://ec.europa.eu/finance/financial-markets/derivatives/index_en.htm> accessed 9 August 2016. Nevertheless, 'a third party holder may use the initial margin received in cash for reinvestment purposes'. CDR 2016/2251, art 20(2).

guidelines published in 2014 prohibit UCITS[48] from re-using non-cash collateral.[49] No similar restriction exists for a firm to re-use its client's collateral assets, however.[50] More generally, the UCITS Directive,[51] the AIFM Directive[52] and the FCA rules introduce certain restrictions on the ability of investment funds and their depositary institutions to re-use collateral.[53]

In the U.S., the Commodity Futures Trading Commission (CFTC), and a group of five prudential regulators,[54] have issued final rules that introduce margin requirements for bilaterally cleared derivatives.[55] These final rules prohibit the custodian to re-use the collateral it holds.[56] Nevertheless, they recognise the possibility that the custody agreement will permit the collateral provider to substitute

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[48] UCITS stands for Undertakings in Collective Investments in Transferrable Securities. They are, essentially, mutual funds that comply with the requirements set out in the Directive 2009/65/EC and any rules of European Union law applicable to them. For a definition of UCITS, see Directive 2009/65/EC of the European Parliament and of the Council of 13 July 2009 [2009] OJ L 302/32, as amended, ("UCITS IV Directive"), art 1(2).

[49] See ESMA, 'ESMA Guidelines for Competent Authorities and UCITS Management Companies' (2014) ESMA/2014/937 para 43(i). These guidelines, however, do allow UCITS to re-use cash collateral under certain circumstances. See ibid 43(j). In the UK, see, more generally, FCA Handbook, Collective Investment Schemes Sourcebook ("COLL"), r 5.4.8 G. The FCA Rules also seem to restrict the ability of UCITS to re-use collateral posted in one transaction to collateralise another derivative transaction. According to COLL 5.3.2 G (3), 'In accordance with COLL 5.1.3 R (2)(b) (Treatment of obligations), cover used in respect of one transaction in derivatives or forward transaction should not be used for cover in respect of another transaction in derivatives or a forward transaction.' The wording of this provision is not very clear, however, and it could also be interpreted as a restriction on the covered fund to use the same assets to collateralise two different transactions.

[50] See, generally, CASS 3, and CASS 9.3 for prime brokers. See also CASS, rr 6.2.1 R, 6.4.1 R.

[51] UCITS IV Directive.

[52] Directive 2011/61/EU of the European Parliament and of the Council of 8 June 2011 [2011] OJ L 174/1 ("AIFM Directive").

[53] See UCITS IV Directive, art 22(7); AIFM Directive, art 21(10). In particular, article 22(7) of the UCITS Directive IV prohibits the '[d]epositary, or any third party to which the custody function has been delegated, [to] re-use collateral for their own account.' Assets held in custody may be re-used only (i) for the account of the UCITS, (ii) following the instructions of the management company on behalf of the UCITS, (iii) for the benefit of the UCITS and in the interest of the unit holders, and (iv) when the transaction is covered by high quality collateral that is received under a TTCA. In the U.K., see FUND, rr 3.11.24 R, 3.11.28 R (4)(d) and (e), 3.11.30 R.

[54] The Office of the Comptroller of the Currency (OCC), the Fed, the Federal Deposit Insurnace Corporation (FDIC), the Farm Credit Administration and the Federal Housing Finance Agency.

[55] See PR final rules; CFTC final rules. The Securities and Exchange Commission (SEC) is expected to adopt final rules for security-based swaps. As of December 2016, the SEC had not adopted such rules.

[56] See PR final rules, s _.7(c); CFTC final rules, s 23.157(c)(1).

posted collateral, or to direct the custodian to reinvest cash collateral in eligible collateral subject to certain restrictions.[57] Unlike initial margin, variation margin need not be segregated and may be re-used.[58]

If velocity were restricted to 0, i.e. if regulators imposed a complete ban on collateral re-use, the reduction of the multiplication effect would be even greater than in those cases where velocity is restricted to 1, for example. In fact, the multiplication effect would be eliminated, and so would be the potential amplification of asset value contagion.[59]

Table 7.2 provides a summary of the main regulatory strategies that will have a direct or indirect effect on the amplification effect of collateral re-use.

Table 7.2. Reducing amplification effect: regulatory strategies

| **Reform** | **Market scope** | **E.U.** | **U.S.** | **Effect on re-use** |
|---|---|---|---|---|
| Prohibition to re-use for own purposes | SFTs | Pending | Pending | Reduce multiplication effect.<br>Reduce velocity (indirectly).<br>Avoid collateral chains across markets. |
| | B.c. derivatives (IM) | No | No | |
| Complete ban | B.c. derivatives (IM) | ESMA/2014/937; CDR 2016/2251, art 20 | PR final rules, s _.7(c); CFTC final rules, s 23.157(c)(1) | Eliminate multiplication effect.<br>Eliminate velocity. |

[57] See PR final rules, s _.7(d); CFTC final rules, s 23.157(c)(3).

[58] See PR final rules, 80 Fed. Reg. 74840, 74874; CFTC final rules, 81 Fed. Reg. 636, 687-88.

[59] Although the collateral taker will still be able to create a sub-security interest in the collateral assets, a sub-security will not have a multiplication effect. Under U.K. law, in a sub-security, the collateral taker will transfer the relevant security interest coupled with an assignment of the debt secured by that interest. See Goode, *Goode on Legal Problems of Credit and Security* (ch 1, n 4) 1–74. As a result, there will only be one party liable for the return of the posted collateral assets: the sub-chargee.

It is important to note, however, that just as the effect of advantages of restricting collateral velocity would increase with the degree of restriction, so would the effect on its disadvantages. In this sense, a complete ban on re-use would aggravate the three disadvantages described above in relation to indirect restrictions on collateral velocity. If derivatives dealers are unable to re-use collateral received in bilaterally cleared derivatives, these transactions will absorb collateral assets from other parts of the market, thereby aggravating any potential collateral shortage. Moreover, a complete ban on re-use will change the current business model of derivatives dealers since they will be unable to re-use collateral received under one derivative transaction to collateralise an offsetting transaction. As a result, derivatives dealers may have to source collateral assets somewhere else at a cost. Such increased cost may deter them from standing as market makers in the first place, or it may give them incentives to transfer that cost to end users. This could erode the appeal of bilaterally cleared derivatives as risk management tools, discouraging economic agents from new investments and thereby undermining credit and economic growth.

The argument is important: hindering the ability of derivatives markets to provide a core function to the economy such as risk management could result in an erosion of financial stability. Nevertheless, not every constraint on the ability of market participants to perform intermediation functions will erode financial stability. For example, reducing intermediation in these markets may only result in a reduction of their size, which could arguably affect credit and economic growth; but these are different policy objectives altogether. Moreover, it is unclear that a complete ban on collateral re-use will inevitably hinder the capacity of financial markets to provide those core functions: market participants may turn to existing alternative products for

the provision of those functions, e.g. centrally cleared derivatives or bespoke insurance contracts. It is also possible that financial markets will react to a complete ban on collateral re-use by creating new financial products designed to elude the supervisors' oversight and the application of restrictive regulation.

All these reactions will lead to changes in those alternative markets which would probably expose the system to unexpected systemic risks. For example, concentrating risk management functions in fewer markets will make these more relevant for systemic stability. Central actors in those markets such as CCPs and insurance companies may become "systemically important".[60] Regulators will need to be aware of these potential new risks and ensure that they have the technical and legal capacity to monitor and contain them.

In addition, a complete ban on collateral re-use might increase documentation costs for market participants.[61] Because the transfer of full title over the collateral assets has an implicit right to re-use the collateral, a complete ban on collateral re-use would cast doubt on the ability of market participants to rely on TTCAs. As a result, we might see market participants, particularly in the U.K., relying increasingly

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[60] Indeed, in recent years, the FSB has turned its attention to the systemic risks posed by insurance companies and CCPs. In November 2011, it published a series of policy measures to address the systemic and moral hazard risks associated with systemically important financial institutions (SIFIs). See FSB, 'Policy Measures to Address Systemically Important Financial Institutions' <http://www.fsb.org/2011/11/r_111104bb/> accessed 2 January 2017. In July 2013, the FSB, in consultation with the International Association of Insurance Supervisors (IAIS) and national authorities, identified an initial list of nine global systemically important insurers (G-SIIs) and extended the framework laid down in the November 2011 report to these G-SIIs. See FSB, 'Global Systemically Important Insurers (G-SIIs) and the Policy Measures That Will Apply to Them' <http://www.fsb.org/wp-content/uploads/r_130718.pdf> accessed 2 January 2017. As of December 2016, there are nine G-SIIs. For a complete list, see FSB, '2016 List of Global Systemically Important Insurers (G-SIIs)' <http://www.fsb.org/wp-content/uploads/2016-list-of-global-systemically-important-insurers-G-SIIs.pdf> accessed 2 January 2017. Recently, the FSB has also issued a discussion note to explore resolution planning of CCPs. See FSB, 'Essential Aspects of CCP Resolution Planning' (2016). At the end of November 2016, the European Commission issued a Proposal for a Regulation of the European Parliament and of the Council on a framework for the recovery and resolution of CCPs, COM(2016) 856/2, available at http://ec.europa.eu/finance/financial-markets/docs/ccp/161128-ccp-proposal_en.pdf.

[61] The industry has described the changes to contract documentation that would arise as a result of the new margin requirements as 'a major resource and capacity challenge'. Mr. Scott O'Malia, chief executive of ISDA, quoted in Stafford and Brunsden (ch 3, n 36).

more on SICAs such as the ISDA Credit Support Deed, or moving their derivatives business to the U.S. and using a NY CSA to document their transactions.[62, 63] The NY CSA itself will have to be amended to exclude the possibility of the collateral taker re-using collateral received as initial margin.[64] It may be more difficult for market participants to move their derivatives business to jurisdictions where collateral takers are allowed to re-use collateral indiscriminately because the BCBS/IOSCO framework also recommends that collateral is re-used with, and held by, entities that are regulated 'in a jurisdiction that meets all of the specific conditions contained in this section and in which the specific conditions can be enforced by the initial margin collector'.[65]

These costs associated with changes in documentation practices are private costs rather than social costs. Even if financial services firms, who normally draft this documentation for clients, transmit these documentation costs to their clients, the impact of these costs will be relatively short-term, until the new documentation consolidates as the new market practice, whereas the benefits associated with a reduction in systemic risk will span a longer horizon.

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[62] Indeed, in 2016, ISDA has published a new version of the Credit Support Deed for use between parties that will be subject to the new margin requirements during Phase One of their implementation. As of December 2016, ISDA had not published an equivalent version of the ENG CSA. It has published, however, an equivalent version of the NY CSA. In the same year, ISDA has also published updated versions of the NY CSA and the ENG CSA that are limited to variation margin and that meet the new margin requirements for bilaterally cleared OTC derivatives. ISDA has not published an updated version of the Deed for variation margin, however. See ISDA, 'ISDA Credit Support Documentation' (ch 3, n 37).

[63] In the U.K., a complete ban on re-use would also lead to the application of client asset protection rules. See CASS, rr 3.1.3 R, 6.1.6 R.

[64] See NY CSA, s 6(c).

[65] BCBS and IOSCO (ch 1, n 63) 21.

## B. Mitigating the risk of runs by collateral providers

In its August 2013 report, the FSB referred to the uncertainty surrounding the collateral taker's re-use of received collateral and its implications for the collateral provider in the event of the former's insolvency as a factor that 'may increase the possibility of a run on a prime-broker if there are concerns about its credit worthiness'.[66] On the other hand, the BCBS/IOSCO policy framework did not regard such run risk as a potential source of systemic risk. Nevertheless, despite their different degrees of concern with collateral re-use as a driver of run behaviour, all these international bodies have proposed regulatory reforms that can have an impact, even if unintentionally, on the incentives of collateral providers to run from their collateral takers.

### 1. Reducing the incentives of collateral providers to run

Some of the existing or prospective legislation that has been produced in response to the financial crisis introduces regulatory requirements that could reduce the incentives of collateral providers to run in the first place. These pieces of legislation and the regulatory requirements included therein fall within three different strategies.

#### *a. Ensuring the liquidity of the re-user*

In its August 2013 report, the FSB recommended that '[o]nly entities subject to adequate regulation of liquidity risk should be allowed to engage in the [re-use] of client assets.'[67] As of December 2016, however, regulators in the U.K. and the U.S.

[66] FSB, 'Strengthening Oversight and Regulation of Shadow Banking. Policy Framework for Addressing Shadow Banking Risks in Securities Lending and Repos' (n 72) 5.

[67] FSB, 'Strengthening Oversight and Regulation of Shadow Banking. Policy Framework for Addressing Shadow Banking Risks in Securities Lending and Repos' (ch 1, n 63) 16. The original recommendation refers to "re-hypothecation". However, by re-hypothecation, the FSB understands

were yet to implement any of these recommendations. In the context of bilaterally cleared derivatives, the BCBS and IOSCO made a similar recommendation: one of the conditions upon which the collateral taker would be allowed to re-use initial margin was that '[it] [be] subject to regulation of liquidity risk'.[68]

In recent years, the Basel III Accords have introduced new and stricter capital requirements than those that had been introduced in the previous rounds of Accords before the financial crisis.[69] The Basel III Accords impose two types of capital requirements: a minimum capital requirement of 8% of risk weighted assets,[70] which is made up of three components,[71] and a series of capital buffers that may or may not apply depending on the circumstances of the bank and the circumstances of the economic cycle.[72] These capital requirements aim to protect the bank's stability 'by

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the broad re-use, as defined in this dissertation, of clients' assets by a financial intermediary. See e.g. ibid 15.

[68] BCBS and IOSCO (ch 1, n 63) 21.

[69] The original Accords date back to the late 1980s and are often referred to as Basel I. The original Accords were subsequently reviewed twice in the first decade of the 2000s before the third round of Accords was adopted in 2010. For a brief overview of the process, see Armour and others (ch 2, n 36) 295–96. For a more detailed historical analysis, with particular reference to the U.S. context, see Michael S Barr, Howell E Jackson and Margaret E Tahyar, *Financial Regulation: Law and Policy* (Foundation Press 2016) 289–305.

[70] Capital requirements are set as a percentage of a bank's assets. The value of the bank's assets, however, as the denominator of such ratio, may vary according to the perceived riskiness of different classes of asset. In the context of the Basel Accords, this process is known as "Risk-Weighting of Assets". There are two general approaches to calculate risk weights: a "standardised approach", which is presented in the capital rules, and an "internal ratings-based" approach, which is carried out by banks themselves. It is important to note, however, that the Basel III Accords have also introduced an unweighted leverage ratio that aims to set a floor below which risk-weighted requirements cannot fall. "Stress tests" also aim to complement risk-weighting mechanisms. For a critical overview of the risk-weighting of assets, see Armour and others (ch 2, n 36) 299–305.

[71] These three components are: i) "Core Equity Tier 1" (CET1) capital, i.e. funds contributed through ordinary share subscriptions and undistributed profits; and ii) "Additional Tier 1" (AT1) or Tier 2 (AT2) capital, both which may be composed of preference shares and/or subordinated debt. This minimum capital requirement is composed of 4.5% CET1, 1.5% AT1, and 2.5% AT2 or risk weighted assets.

[72] These buffers include i) a Capital Conservation Buffer of 2.5% CET1 capital; ii) an additional buffer composed of CET1 that will apply to Global Systemically Important Banks (G-SIBs) and that will vary depending on a series of parameters, but which national regulators may extend to domestic SIBs; and iii) a counter-cyclical capital buffer of up to 2.5% CET1 that national regulators may apply at their discretion to constrain lending by banks during an economic boom. A detailed analysis of these capital requirements is beyond the scope of this dissertation. For an overview, see Armour and others (ch 2, n 36) 306–09. For an updated list of G-SIBs, see FSB, '2016 List of Global Systemically

reassuring short-term funders that any losses experienced by the bank from bad loans or from "fire sale" valuations on forced asset sales will be absorbed by the bank's shareholders, not its short-term funders'.[73]

In addition to these capital requirements, the Basel III Accords have also introduced liquidity requirements, which had not been present in previous rounds of the Accords. These requirements aim to improve the bank's capacity to meet its short-term commitments without having to sell illiquid assets.[74] In particular, the Basel III Accords introduce two liquidity requirements: i) a Liquidity Coverage Ratio (LCR), which requires banks to hold enough high-quality liquid assets (HQLA) to endure net cash outflows over thirty days in a specified stress scenario, and ii) a Net Stable Funding Ratio (NSFR), which aims at discouraging banks from relying excessively on short-term funding from wholesale markets.[75]

The capital and liquidity requirements under the Basel III Accords will not enter into force until January 2019.[76] Nevertheless, at the end of 2014, the largest

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Important Banks (G-SIBs)' <http://www.fsb.org/wp-content/uploads/2016-list-of-global-systemically-important-banks-G-SIBs.pdf> accessed 2 January 2017.

[73] Armour and others (ch 2, n 36) 316.

[74] See ibid.

[75] A detailed analysis of these liquidity requirements is beyond the scope of this dissertation. For an overview of these requirements, see ibid 322–24.

[76] In the E.U., the Basel III Accords have been implemented by the Regulation (EU) No 575/2013 of the European Parliament and of the Council of 26 June 2013 ("CRR") [2013] OJ L 176/1, and the Directive 2013/36/EU of the European Parliament and of the Council of 26 June 2013 ("CRD IV") [2013] OJ L 176/338. On 23 November 2016, the European Commission proposed a series of amendments to the CRD IV and the CRR, including the introduction of more risk-sensitive capital requirements. See European Commission, 'EU Banking Reform: Strong Banks to Support Growth and Restore Confidence' <http://europa.eu/rapid/press-release_IP-16-3731_en.htm?locale=en> accessed 2 January 2017. In the U.S., the OCC and the Fed approved a final rule on regulatory capital requirements on 11th October 2013. See Regulatory Capital Rules; Final Rule, October 11, 2013, 78 Fed. Reg. 62018. A year later, the same two regulators and the FDIC approved a final rule on the LCR. See Liquidity Coverage Ratio: Liquidity Risk Measurement Standards; Final Rule, October 10, 2014, 79 Fed. Reg. 61440. In May 2016, the same regulatory agencies proposed a rule on the NSFR and opened a consultation period. See FDIC, Fed and OCC, 'Agencies Propose Net Stable Funding Ratio Rule' <https://www.federalreserve.gov/newsevents/press/bcreg/20160503a.htm> accessed 2 January 2017.

internationally active banks had already met some of the capital requirements and had improved their holdings of HQLA.[77]

In principle, these regulatory requirements will contribute to improving the solvency and liquidity of the collateral taker that re-uses collateral and, thus, they could mitigate the run incentives of collateral providers.[78] However, their efficacy is uncertain.[79] As in the case of the recent exemptions to bankruptcy safe harbour provisions described in Section III.A.1, we will only be able to assess the effectiveness of these regulatory requirements with hindsight. Moreover, compliance with these requirements will not exclude the probability of insolvency. Although the recommendations of the FSB, the BCBS and IOSCO should be welcomed, they should be complemented with additional measures in order to address the effect of collateral re-use on runs more effectively.

*b. Protecting collateral provider's proprietary rights in the assets*

A common strategy to protect customers' rights in the assets they hold with a financial services provider is to require the latter to hold customers' assets and its own assets in separate accounts. This is often referred to as "segregation". For

[77] See Laura Noonan and Caroline Binham, 'Global Banks Reach Almost All 2019 Capital Standards' *Financial Times* (15 September 2015) <https://www.ft.com/content/419b7c12-5b98-11e5-a28b-50226830d644> accessed 2 January 2017.

[78] Liquidity requirements will do so directly, and capital requirements will do it indirectly. If the bank does not hold enough liquid assets to endure a run by short-term debtors, it will have to start selling illiquid assets at fire sale prices. In other words: a liquidity constraint can evolve into a solvency constraint. Strict capital requirements can allow the bank to raise additional finance against its assets at reasonable rates, thereby increasing its probability of surviving the run. In this sense, 'a very high level of capital could function as a substitute for a very high level of liquidity'. Armour and others (ch 2, n 36) 291.

[79] In addition, liquidity and capital requirements also have clear costs for the real economy. For example, liquid assets held on balance sheet to meet prudential regulatory requirements will not be lent out to the real economy. The trade-off, however, should be resolved in favour of the benefits associated with reducing systemic risk.

example, in the context of SFTs, in the U.S., SEC Rule 15c3-3 requires a prime broker to segregate customers' assets that it does not re-use from its own assets.[80]

In relation to bilaterally cleared derivatives, the BCBS and IOSCO have proposed that the collateral taker segregates the collateral provider's assets as a necessary condition for the former's right to re-use.[81] They require that:

> Collateral collected as initial margin from the customer is treated as a customer asset, and is segregated from the initial margin collector's proprietary assets *until re-[used]*. Once re-[used], the third party must treat the collateral as a customer asset, and must segregate it from the third party's proprietary assets. Assets returned to the initial margin collector after re-[use] must also be treated as customer assets and must be segregated from the initial margin collector's proprietary assets.[82]

In addition, the BCBS and IOSCO require that 'the initial margin collector must give the customer the option to segregate the collateral that it posts from the assets of all the initial margin collector's other customers and counterparties (ie individual segregation)'.[83] If the collateral provider has opted for such individual

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[80] The prime broker must hold these assets in a "reserve" account. See 17 C.F.R. s 240.15c3-3(e)(1), (f).

[81] According to the BCBS and IOSCO, 'the use of third-party custodians is generally considered to offer the most robust protection'. BCBS and IOSCO (ch 1, n 63) 20. Yet, they also warn that 'there have been cases where access to assets held by third-party custodians has been limited or practically difficult'. ibid. They point to the local bankruptcy regime as an important factor that can affect the level of protection. See ibid.

[82] BCBS and IOSCO (ch 1, n 63) 21 (emphasis added). The original statement uses the term "re-hypothecation. However, the BCBS and IOSCO seem to use this term in the broader sense of "re-use". See ibid 21.

[83] BCBS and IOSCO (ch 1, n 63) 20–21. A client's assets can be segregated in an omnibus account, where they are pooled with the assets of other clients, or they can be segregated in an individual account, where they will be held separately from the assets of other clients. For a more detailed discussion about segregation in OTC derivatives, see Chapter 3.

segregation, the third party –i.e. the subsequent collateral taker– must segregate the collateral assets in a similar fashion, i.e. holding them separately 'from the assets of the third party's other customers, counterparties and its proprietary assets'.[84] The BCBS and IOSCO also require that '[t]he collateral of customers that have consented to the [re-use] of their collateral must be segregated from that of customers that have not so consented.'[85]

Regulators in the E.U. and the U.S. have recently seconded these recommendations.[86]

The segregation of collateral assets aims at protecting the proprietary rights of collateral providers in the event of the collateral taker's insolvency. By requiring the collateral taker to hold its own assets and its clients' assets separately, segregation permits these latter assets to be excluded from the insolvent estate. In principle, such separation would reduce the incentives of collateral providers to run. Nevertheless, the proposed segregation requirements require a careful analysis.

Not all forms of segregation will provide the collateral provider the same level of protection. For example, if the collateral provider's assets are segregated together with assets of other clients of the collateral taker in an omnibus account, in the event of the collateral taker's insolvency, tracing the specific cash or securities that belong to the collateral provider can be quite difficult given the fungible nature of the assets. Any cash or securities that are lost in the omnibus account will have to

[84] ibid 21.

[85] ibid.

[86] In the E.U., see CDR 2016/2251, art 19. In the U.S., see PR final rules, s _.7; CFTC final rules, s 23.157.

be shared pro rata between the different clients. The segregation of assets in an individual account will improve the level of protection.[87]

Moreover, proprietary rights in collateral may not always eliminate run incentives. For example, recent academic studies have shown that collateral takers in the tri-party repo market were reluctant or unprepared to seize collateral in the event of their counterparty's insolvency and preferred to reduce their exposures to weak dealer counterparties despite the high quality of collateral.[88] In a similar vein, we could expect collateral providers to refrain from waiting to recover their assets in an insolvency proceeding given the costs associated with that strategy; most notably, the probability of not being able to recover all the posted assets, e.g. because of difficulties associated with tracing fungible assets if these have not been segregated in an individual account, or the probable delay with which any collateral will be recovered,[89] in addition to the costs of hiring legal advisors to guide them through the process of recovery.

Another important caveat is necessary. The BCBS/IOSCO policy framework uses the term "re-hypothecation" in the broader sense of "re-use".[90] However, as described in chapter 1, a right to re-use requires the collateral provider to relinquish all of her proprietary interests in the collateral assets. She will only hold a personal

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[87] For example, SEC Rule 15c3-3 does not specify whether the prime broker is required to segregate customer assets into individual or omnibus accounts. See 17 C.F.R. s 240.15c3-3(f).

[88] See e.g. Copeland, Martin and Walker, 'Repo Runs: Evidence from the Tri-Party Repo Market' (ch 6, n 8).

[89] For example, an insolvency administrator may bar secured parties from recovering their assets immediately upon the debtor's filing for insolvency, and may only allow them to do so after the formal initiation of the insolvency proceedings. In recent years, holders of financial collateral under certain financial products have been exempt from these automatic stay provisions. Nevertheless, recent regulatory reforms will require these claims to be subject to very short automatic stays in order to facilitate the transfer of SFTs and derivatives portfolios to other market participants. As a result, if these portfolio transfers are successful, holders of financial collateral may not even be allowed to seize their collateral. In any event, collateral providers will not be in control of the securities collateral and thus they would not typically fall under the scope of those safe harbour provisions, so the insolvency administrator may still stay their claims to recover such control.

[90] See BCBS and IOSCO (ch 1, n 63) 21.

claim against the collateral taker for the return of the same or equivalent assets. In this sense, a right to re-use is incompatible with the segregation of assets in the collateral provider's name. The segregation requirement must then be understood as being applicable only in cases where the collateral provider continues to hold a proprietary interest in the assets, i.e. only when the assets have been transferred under a SICA, and only until the collateral taker has exercised her right to re-use.[91] In other words: the collateral taker will not be required to segregate the collateral if she decides to re-use the assets, or if she receives full title over them under a TTCA. The BCBS/IOSCO framework does say, however, that regulators need to protect the customer from the risk of loss in the event that '[either or] both the initial margin collector or the third party become insolvent'.[92] Yet, they do not make any specific recommendations, and, indeed, it is difficult to think of any when the collateral provider has agreed to relinquish her proprietary rights in the assets. Therefore, segregation will not always provide effective protection of the collateral provider's proprietary interests in the collateral assets and additional measures may be required to reduce the incentives of collateral providers to run.[93] One such additional measure

[91] The prevailing opinion seems to be that the collateral provider under a SICA does not waive its proprietary rights until the right to re-use is actually exercised. This opinion is favoured by regulators and legal scholars in the U.K. It has even received some support from the courts. For a detailed analysis, see Chapter 1, n 113. Indeed, according to the FCA rulebook, 'Principle 10 (Clients' assets) requires a firm to arrange adequate protection for client's assets *when it is responsible for them.*' CASS, r 9.3.2 G (1) (emphasis added). In the case of TTCAs, it is unquestionable that the collateral provider will effectively relinquish her proprietary rights in the assets upon the transfer of full title. Nevertheless, in the case of SICAs, an interesting question arises: if the collateral taker receives a right to re-use under a SICA, and exercises it by granting a new security interest over it, i.e. by re-hypothecating the collateral rather than re-using it, would the collateral provider be deemed to have relinquished its proprietary rights in the assets? Under the prevailing opinion referenced above, the collateral provider's grant of a right to re-use would not be sufficient to conclude that the she has relinquished her proprietary rights; the collateral taker's exercise of her right would be needed. In light of this interpretation, one could answer that question in the positive: if the collateral taker does not exercise the right to re-use to its fullest extent, the collateral provider should be deemed to retain her proprietary interest in the assets. In that case, the segregation requirements would apply.

[92] BCBS and IOSCO (ch 1, n 63) 21.

[93] Indeed, in the context of SFTs, in the U.S., it is not the requirement to segregate customers assets under Section (f) of the SEC Rule 15c3-3 that prevents the prime broker's right to dispose of the

could be a direct or indirect restriction of collateral velocity, as described in Section III.A.2.[94]

*c. Reducing the amount of collateral providers' unsecured claims*

In the U.S., SEC Rule 15c3-3 only allows prime brokers to re-use a client's assets up to 140% of that client's liabilities to the prime broker.[95] This Rule also prohibits a prime broker to use clients' assets to raise more money than it has lent to those clients.[96] Under these circumstances, and provided that there is an enforceable close-out netting mechanism in place, the collateral provider would have an unsecured claim for a maximum of 40% of its liabilities, and a secured claim for the return of any assets that the collateral taker has not re-used.[97] It is important to note, however, that SEC Rule 15c3-3 does not apply to collateral received under an OTC derivative contract.[98]

Today, no similar restriction exists in the U.K.[99] Nevertheless, the FSB has made a recommendation to harmonise regulation in this regard.[100]

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assets, but the additional requirement for the prime broker to 'have a written contract with the [depositary] bank which provides that the […] qualified securities will at no time be used directly or indirectly as security for a loan to the broker or dealer by the bank and will not be subject to any right, charge, security interest, lien, or claim of any kind in favor of the bank or any person claiming through the bank.'

[94] Nevertheless, such restrictions would bring adverse consequences; namely: aggravating potential collateral shortages, and substantially increasing the cost of bilaterally cleared derivatives, which could hinder the ability of entrepreneurs to hedge their risks and could thus undermine credit and economic growth.

[95] For example, if a client holds with its prime broker securities with a market value of $USD200m and has an obligation to repay the prime broker a loan of $USD100m, the prime broker will only be able to re-use client's securities with a market value of $USD140m. See 17 C.F.R. ss 240.15c3-3(a)(5), (f).

[96] See 17 C.F.R. s 240.15c3-3(e)(2).

[97] Yet, it is important to note that the probability of the client recovering the assets that have not been re-used may decrease if the prime broker had commingled the client's assets with those of other clients. See n 105..

[98] See 17 C.F.R. s 240.15c3-3(a)(1).

[99] According to Barr, Jackson and Tahyar, prime brokers in the U.S. structure their transactions to take advantage of the U.K.'s less restrictive rules, which effectively place no limit on the amount of assets

As I described in Chapter 6, when the collateral provider transfers full title over the collateral assets to the collateral taker, any claim against the latter for the return of equivalent collateral will only be unsecured in relation to any over-collateralised amount, i.e. for any collateral that the collateral taker holds in excess of her exposure to the collateral provider.[101] In this sense, the 140% restriction puts a limit to the collateral provider's unsecured claim. In principle, this would reduce the incentives of collateral providers to run from an over-collateralised collateral taker. Nevertheless, the question is whether a limitation of 40% of a client's liabilities would discourage that client from seeking to reduce her exposure to her prime broker in the presence of doubts about the prime broker's solvency. Most likely, the answer will be no.

In addition to the 140% statutory limitation, in the U.S., the Securities Investor Protection Act of 1970 (SIPA) introduces an investor protection scheme that guarantees part of an investor's claim for securities against certain brokers or dealers. A membership corporation composed of registered brokers or dealers, the Securities Investor Protection Corporation (SIPC),[102] can apply to a competent court for the issuance of a protective decree, to which the debtor broker or dealer will need to consent.[103] If the decree is issued, customers of the relevant broker or dealer will generally be entitled to an advance of $USD500,000 from the SIPC to compensate

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that can be re-used or the amount of funds that can be raised through re-use. See Barr, Jackson and Tahyar (n 87) 1238. For a detailed analysis of these "arranged financing" practices, see Carlsson-Sweeney (ch 2, n 45). This regulatory divergence may also explain why, after Lehman Brothers filed for insolvency, clients that held their assets with the U.S. subsidiary were able to recover their assets much more quickly than clients who held their assets with the London subsidiary.

[100] In its August 2013 report, the FSB called for the harmonisation of client asset rules 'to limit the potential for regulatory arbitrage across jurisdictions'. FSB, 'Strengthening Oversight and Regulation of Shadow Banking. Policy Framework for Addressing Shadow Banking Risks in Securities Lending and Repos' (ch 1, n 63) 16.

[101] Provided that the parties have agreed to a close-out netting mechanism and that it is enforceable.

[102] See SIPA, s 3(a).

[103] See SIPA, s 5(b)(1).

their claims.[104] The trustee may use such advances to purchase equivalent securities owed to the customer.[105] Any claim that cannot be satisfied with the SIPC advance will be unsecured and will be satisfied pro rata with the remaining estate of the broker or dealer.[106] A similar scheme is in place in the E.U., albeit with a much lower level of protection.[107]

In essence, these investor protection schemes work like claims against deposit insurance schemes: they are unsecured claims against a mutualised fund composed of contributions from its members.[108] This type of guarantee will not reduce the amount of the collateral provider's unsecured claim, but it can provide the latter with an unsecured claim against a more creditworthy institution.

Nevertheless, the effectiveness of these investor protection schemes to reduce the run incentives of collateral providers faces two important limitations. First, they are limited to relatively small amounts. Although this coverage may protect the full claims of the vast majority of investors, it leaves the largest investors largely unprotected, who will still have an incentive to run. Any meaningful protection for these larger investors would require considerable contributions to the guarantee fund that would make it extremely costly for its members altogether and, thus, unattractive.

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[104] See SIPA, s 9(a).

[105] See SIPA, s 8(d).

[106] See SIPA, ss 6(d), 8(b)(2), 8(c)(1), and 16(4)(A).

[107] The minimum level of compensation is €20,000. See Directive 97/9/EC of the European Parliament and of the Council of 3 March 1997 on investor-compensation schemes ("ICS Directive") [1997] OJ L 84/22, art 4(1). The European Commission has recently proposed to increase that level to €50,000. See Proposal for a Directive of the European Parliament and of the Council amending ICS Directive, 12 July 2010, COM/2010/0371 final, s 4.3.6.

[108] Like deposit insurance schemes, the SIPC fund is composed of members' contributions. See SIPA, s 4(c). The SIPC may also raise funds from alternative sources. See SIPA, ss 4(d), 4(f), 4(g). Additionally, the SIPC will also enjoy priority in recuperating its advances from the remaining estate, including customer property. See SIPA, s 8(c)(1). In the E.U., see ICS Directive, arts 5(2), 7(1).

The second limitation concerns the actual membership of the guarantee fund. If the aim is to protect retail investors, identifying potential funders is relatively easy: the providers of financial services will contribute to the fund that will protect investors' interests. However, in wholesale markets, where the two parties to the transaction may both be providers of financial services, it can be difficult to ascertain which one of the parties is in need of protection, and, thus, which one should contribute to the fund. Indeed, in the case of SFTs and OTC derivatives, the range of market participants that may stand as collateral takers or collateral providers is very wide and heterogeneous. In fact, under a derivatives contract, the same party may stand as collateral provider or collateral taker under the same transaction depending on the valuation of the underlying obligations. It can actually change from one position to the other in a matter of days.

In the context of OTC derivatives, it is interesting to note that recent regulatory recommendations seem to point in the opposite direction. As discussed in Section II.A.2.a above, the BCBS and IOSCO have recommended that both parties to a bilaterally cleared derivative exchange initial margin, and that they do so on a gross basis. Effectively, this will double the number of collateral providers per transaction, making them both stand as unsecured creditors against each other as long as the amount of initial margin they post is greater than their counterparty's exposure. These recommendations intend to guarantee adequate protection to 'two market participants with large gross derivatives exposures to each other in the case of one firm's failure'.[109] Nevertheless, additional regulatory measures will be necessary to ensure that the exchange of initial margin on a gross basis does not make the bilaterally cleared derivatives market even more prone to runs. I will explore some of

[109] BCBS and IOSCO (ch 1, n 63) 20.

the additional regulatory measures proposed by the FSB and BCBS/IOSCO in the following sections.

### 2. Improving the ability of collateral providers to assess risk

The main concerns of the FSB and of BCBS and IOSCO with collateral re-use are grounded on the opacity that surrounds collateral re-use practices.[110] Indeed, as we saw in Chapter 6, one of the problems that precipitated runs in the SFTs and OTC derivatives markets during the 2008-09 financial crisis was the inability of creditors to evaluate their counterparty credit risk. In this sense, these international bodies have advocated for an increase in transparency to improve the ability of collateral providers to evaluate their counterparty credit risk that results from granting the collateral taker a right to re-use.

The FSB, for example, has required financial intermediaries to provide 'sufficient disclosure to clients in relation to re-hypothecation of assets so that clients can understand their exposures in the event of a failure of the intermediary'.[111] Similarly, in the U.K., the Financial Conduct Authority (FCA) rules require prime brokers to give their clients express information about the risks associated with the re-use of the latter's assets.[112] At the E.U. level, article 15(1) of the "Transparency of

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[110] See FSB, 'Strengthening Oversight and Regulation of Shadow Banking. Policy Framework for Addressing Shadow Banking Risks in Securities Lending and Repos' (n 72) 8; BCBS and IOSCO (n 72) 19.

[111] See FSB, 'Strengthening Oversight and Regulation of Shadow Banking. Policy Framework for Addressing Shadow Banking Risks in Securities Lending and Repos' (ch 1, n 63) 16.

[112] Specifically, CASS 9.3.1 R mandates that prime brokerage agreements contain a disclosure annex that includes, among other things, 'a statement of the key risks to that client's safe custody assets if they are used by the firm, including but not limited to the risks to the safe custody assets on the failure of the firm.' CASS, r 9.3.1 R (2)(d). The FCA rules also prevent a depositary institution from re-using collateral unless their client has given its consent. In the case of hedge funds, for example, see FUND, r 3.11.24. For clients' assets more generally, see CASS, r 6.4. Indeed, depositary institutions must inform their clients upon the actual exercise of such right to re-use. See e.g. CASS, rr 6.4.1, 9.2.1(3)(c).

SFTs" Regulation[113] also requires the collateral taker to duly inform the collateral provider of the potential risks of entering into a TTCA or granting the collateral taker a right to re-use posted collateral under a SICA.[114] To date, U.S. regulators have not adopted similar requirements.

In the context of bilaterally cleared derivatives, the BCBS/IOSCO framework has proposed that collectors of initial margin provide their customers with transparent information about the risks associated with granting a right to re-use, particularly in the case of insolvency.[115] The policy framework also recommends that the initial margin collector informs the collateral provider when re-using the collateral, and that it notifies the customer of the amount of cash and securities collateral that has been re-used upon the latter's request.[116]

However, the efficacy of a transparency strategy in reducing systemic risk is, at least, questionable. For example, Holmstrom has argued that increasing transparency may not always be desirable; particularly in relation to money claims.[117] He has criticised that, after the financial crisis, regulatory initiatives to reform money markets misunderstand the logic of debt and the operation of money markets: these initiatives are based on insights grounded in the understanding of stock markets, which are fundamentally different.[118] Transparency is important in stock markets to improve price discovery, which contributes to the efficient

[113] See Regulation (EU) 2015/2365 of the European Parliament and of the Council of 25 November 2015 ("Transparency of SFTs Regulation") [2015] OJ L 337/1.

[114] Paragraph 2 further stipulates that any exercise of such right to re-use must be in accordance with the terms of the relevant financial collateral arrangement and that posted collateral must be transferred from the account of the collateral provider. These reuse requirements will enter into force from 13 July 2016, including for collateral arrangements existing on that date. See Transparency of SFTs Regulation, art 33(2)(d).

[115] See BCBS and IOSCO (ch 1, n 63) 21.

[116] See ibid.

[117] See Holmstrom (n 60).

[118] See ibid 3, 4. For a comprehensive analysis of the different information-related incentives of equity and money claimants, see Judge (ch 6, n 40) 8–13.

allocation of risk.[119] Money markets, however, 'are about obviating the need for price discovery using over-collateralized debt to reduce the cost of lending'.[120] Holmstrom argues that, under certain circumstances, opacity can be purposeful: it can enhance liquidity, and it can make public information less revealing, thereby avoiding panic scenarios.[121] Yet, he concedes that there is an evident trade-off: everything that improves liquidity in good times will aggravate a panic in bad times.[122]

The application of this argument to the specific context of collateral re-use has some limitations. First, purposeful opacity can be criticised from a normative perspective. Indeed, Holmstrom acknowledges this: 'My general argument is that opacity will in many instances enhance liquidity, not that it is socially desirable.'[123] Regulators may want to prioritise the reduction of systemic risk over the promotion of liquidity. As I stated in the Introduction to this Chapter, my analysis relies on the assumption that they will. Second, the argument seems to hold for collateralised claims, but it is less clear that it will hold for unsecured claims. Collateral is

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[119] See Holmstrom (n 60) 3.

[120] ibid 1. Judge refers to those 'large pockets of pertinent and theoretically knowable information not actually known by any market participant or regulator' as "information gaps". See Judge (ch 6, n 40) 6. For a seminal work on the information insensitivity of money claims, see Gorton and Ordoñez (ch 6, n 6).

[121] See e.g. Holmstrom (n 60) 18. He contends that opacity is ubiquitous and cites money market mutual funds (MMMFs) in the U.S., which do not have to report a "floating" net asset value, unlike in Europe, as an example. See ibid 20, 21. These rules are about to change, however. See Joe Rennison, 'US Money Market Fund Reform: An Explainer' *Financial Times* (14 October 2016) <https://www.ft.com/content/93679bf0-0be4-11e6-9456-444ab5211a2f> accessed 19 November 2016. Moreover, Holmström contends that 'central banks have historically promoted opacity to avoid signalling out weak banks'. Holmstrom (n 60) 23. He adds: 'Money itself is surely the most opaque of all instruments. No one knows what exactly backs up the government issued money. […] But the beauty of money is that even if I do not know the exact value of the collateral backing my government's promise, neither does anyone else. So we are *symmetrically ignorant* – a blissful state in many situations.' ibid 22 (emphasis added).

[122] See Holmstrom (n 60) 24. He further specifies: 'A panic is an information event that shatters the shared understanding and beliefs on which liquidity rested.' ibid. For a similar view, and an analysis of the role that "information gaps" can play in panics, particularly within the shadow banking system, see Judge (ch 6, n 40).

[123] Holmstrom (n 60) 21.

described as a mechanism used to dilute the incentives of collateral takers to gather information about credit risk.[124] Unsecured claims, however, are different. In the absence of collateral, those incentives to gather information remain. Only alternative mechanisms will mitigate them. Deposit insurance is an evident example.[125] In the case of collateral re-use, the collateral provider's waiver of her proprietary rights makes her claim against the collateral taker for the return of any over-collateralised amount unsecured. Investor protection schemes, like deposit insurance schemes, are designed to protect retail investors.[126] Moreover, as I argued in the previous sub-section, providing a meaningful protection to wholesale investors today seems rather unrealistic. Hence, additional information about the possible risks associated with re-use could allow the collateral provider to price the re-use premium better.

Nevertheless, a couple of caveats are necessary. Although increased transparency could, in theory, help the collateral provider better assess the risks associated with granting a right to re-use and, thus, better price the re-use premium, this rationale faces two considerable obstacles. First, the decision of collateral providers to grant a right to re-use may be grounded on reasons other than an under-estimation of the associated risks. For example, in an environment where competition to attract funds is fierce, institutional investors such as hedge funds may prefer to receive a re-use premium in order to lure investors with higher potential returns. Fierce competition will put considerable pressure on these funds: a re-use

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[124] In Holmström's words: 'The beauty lies in the fact that collateralised lending obviates the need to discover the exact price of the collateral.' Holmström (ch 6, n 37) 3. In the context of mortgage-backed securities, see Gorton and Ordoñez (ch 6, n 6). In relation to money claims, see Judge (ch 6, n 40) 3. In relation to OTC derivatives, Awrey, points to the joint role of collateral and close-out netting. Nevertheless, he warns that for them to serve as a perfect substitute of counterparty credit risk, they need to meet four conditions that will hardly ever be met in practice. See Awrey (ch 3, n 23) 1149–52.

[125] See e.g. Judge (ch 6, n 40) 3. Another example is fiat money, which is backed by "the full faith and credit" of the government. See Holmstrom (n 60) 22.

[126] In the U.S. and the E.U. there are some investor protection schemes that provide a minimum guarantee. However, these are aimed at retail markets, not wholesale markets. See Section III.B.1.c.

premium can be the difference between staying in business or losing their investors to competing funds. Thus, a competitive environment may give those collateral providers that can only compete in returns an incentive to under-price the re-use premium.[127]

In recent years, industry representatives have stated that, after the experience of many hedge funds with Lehman Brothers, hedge funds have begun to introduce limitations in their contracts regarding the amount of collateral assets that collateral takers can re-use,[128] particularly in the U.K.[129] However, we do not know what proportion of institutional investors out there are actually requesting that such contractual limits be introduced. This leaves the competition argument open.

Second, increasing transparency will not resolve the externalities problem. The two parties to a transaction may not be able to identify the risks that their behaviour will pose on other market participants: only an entity with a systemic view might be able to do so.[130] Such systemic oversight should correspond to a macro-prudential supervisor. But even if they were able to identify those systemic risks, identification will not guarantee that they will internalise the social costs associated

[127] A few funds may be able to attract investors based on the reputation of their managers, for example.

[128] See e.g. Carlsson-Sweeney (ch 2, n 45).

[129] In the U.S., the SIPA establishes a limitation on the amount of a client's assets that prime broker can re-use: 140% of the client's liabilities. In the U.K., however, there is no statutory limit. The FCA rules do require prime brokers, however, to include a disclosure annex in their prime brokerage agreements where they inform their clients about 'the contractual limit, if any, on the safe custody assets which a prime brokerage firm is permitted to use'. CASS, r 9.3.1 R (2)(a). See also FUND, r 3.7.7 R (1)(b).

[130] For example, the two parties will not be able to identify the potential asset value contagion effects of re-using collateral, which ultimately depends on the velocity of similar assets in other markets and on the portfolio composition of other market participants.

with those risks.[131] In this sense, only regulatory action could give market participants incentives to internalise such costs.

### 3. Resolving coordination problems among collateral providers

As described in Section III.A.1 above, regulators in the E.U. and the U.S. have recently introduced, or will soon introduce, exemptions to the otherwise applicable bankruptcy safe harbour provisions that will subject SFTs and OTC derivatives to very short automatic stays. In addition, in the U.S., the SIPA introduces a specific procedure to protect customers of certain brokers or dealers that may be approaching financial difficulty. Upon receipt of an application from the SIPC, the competent court shall issue a protective decree if the debtor broker or dealer consents.[132] Any such application or decree may trigger an automatic stay on the foreclosure on any securities collateral.[133] After appointing a trustee, the court shall 'order the removal of the entire liquidation proceeding to the court of the United States in the same judicial district having jurisdiction over cases under title 11.'[134]

These automatic stay mechanisms aim to reduce coordination problems like the ones described in Chapter 6 that could lead creditors to reduce their exposures to the debtor simultaneously and to produce a socially undesirable outcome. Creditors' rights against the insolvent debtor are stayed to ensure that the insolvent estate is distributed in the most equitable way, i.e. treating similar claims equally.

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[131] In other words: the re-use premium may still be too low to compensate for the resulting externalities.

[132] See SIPA, s 5(b)(1).

[133] See SIPA, s 5(b)(2)(C)(ii).

[134] SIPA, s 5(b)(4). See also, SIPA, s 6(b).

Although these mechanisms can, in theory, solve coordination problems as those described in Chapter 6, the question is how market participants will react to these changes, and whether their reactions could undermine the effectiveness of the proposed regulatory changes. One argument against the efficacy of reintroducing automatic stays for SFTs and OTC derivatives in order to prevent runs is that it will only give market participants incentives to run even earlier: creditors will no longer be trying to anticipate the failure of a given institution, but a supervisory authority's decision to intervene because that institution may be about to fail.

On the other hand, one could argue that supervisory authorities in charge of triggering such preventive mechanisms are in a better position to keep their decision-making process secret than private firms are. The more secrecy they attain, the greater the probability that the early intervention will be successful. Precedents of leaked supervisory decisions, however, illustrate that secrecy is far from easy.[135]

In this sense, the conclusion about the efficacy of this type of mechanisms is no different than the one reached in relation to measures that aim at reducing procyclicality: their efficacy can only be assessed on a case by case basis. Only time will tell whether they manage to prevent the next failure of a financial institution. After all, anticipating an early intervention need not be any more difficult or any easier than anticipating a firm's filing for insolvency.

Table 7.3 provides a summary of the main regulatory strategies that will have a direct or indirect impact on the incentives of collateral providers to run, and of the effect of these strategies on collateral re-use.

[135] In recent years, negotiations about the Greek bailout have offered some examples. See e.g. 'Greece Challenges IMF over "Debt Transcript Leak"' *BBC News* (3 April 2016) <http://www.bbc.com/news/world-europe-35953028> accessed 2 January 2017.

Table 7.3. Mitigating risk of runs by CPS: regulatory strategies

| Reform | Market scope | E.U. | U.S. | Effect on re-use |
|---|---|---|---|---|
| Conditional liquidity risk regulation | SFTs | Pending | Pending | Improve CT's collateral liquidity |
| | B.c. derivatives | No | No | |
| Segregation of collateral | SFTs | No | SEC Rule 15c3-3 | Partial protection of CP's proprietary interest. |
| | B.c. derivatives (IM) | CDR 2016/2251, art 19 | PR final rules, s _.7; CFTC final rules, s 23.157 | |
| Restriction amount of re-use | SFTs | No | SEC Rule 15c3-3 | Limit CP's unsecured claim |
| | B.c. derivatives | | No | |
| Compensation schemes | SFTs | ICS Directive | SIPA | Reduce CP's unsecured claim |
| | B.c. derivatives | | | |
| Increased transparency | SFTs | Regulation (EU) 2015/2365 | Pending | Improve CP's ability assess credit risk |
| | B.c. derivatives | No | No | |
| Short automatic stays | SFTs | BRRD, arts 63, 64, 68-71 | Dodd-Frank, ss 210(c)(8)(D), 210(c)(10)(B) | Improve coordination |
| | B.c. derivatives | | | |
| SIPA protective stay | SFTs | No | SIPA | Improve coordination |
| | B.c. derivatives | | | |

## C. Improving the understanding of collateral re-use

The different regulatory strategies discussed earlier in this Section evidence that international bodies, and national and regional regulators, regard collateral re-use as a potential source of systemic risk. Yet, the level of detail of available data sets about collateral re-use is relatively low. For example, in the context of OTC derivatives, the main source of data on collateral re-use is the market surveys conducted by ISDA. Nevertheless, this data set presents a series of drawbacks: participation in these surveys is voluntary, we know very little about the information that firms are required to submit, the data collected is published on an aggregate basis and has not

been consistent throughout the years,[136] and, as far as we know, it is not available to supervisors at the granular level. In the context of SFTs, regulators have raised similar concerns about a lack of information on market practices.[137]

In recent years, international bodies have proposed several measures that aim to improve reporting and data collection in relation to collateral re-use practices in SFTs and OTC derivatives markets. In relation to SFTs markets, for example, the FSB has recently launched an initiative that seeks to improve and coordinate data collection efforts in relation to SFTs across several jurisdictions. On 18 November 2015, the FSB presented the finalised standards and processes for global securities financing data collection, aggregation and reporting.[138] In the first part of this report, the FSB provided an exhaustive list of data elements to be collected in the repo, securities lending, and margin lending markets.[139] The list is quite comprehensive. It includes data elements such as type of contract, counterparty sector, type of collateral, haircuts, collateral market value, and re-use eligibility, among others.[140] Moreover, the report describes in detail the two-tiered process for data collection and aggregation, under which national/regional authorities will collect and aggregate the data, and then report it to the FSB on a monthly basis, who will aggregate it to

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[136] For example, the current data on collateral re-use published in the ISDA Margin Surveys is only available since 2010. Before that, the Surveys published different data elements on collateral re-use or no data at all.

[137] See e.g. Baklanova, Copeland and McCaughrin (ch 2, n 6) 49–64.

[138] See FSB, 'Transforming Shadow Banking into Resilient Market-Based Finance. Standards and Processes for Global Securities Financing Data Collection and Aggregation' (2015).

[139] For a detailed overview of the different elements to be collected in each of these markets, see ibid 3–18. The report recommends that national/regional authorities report two sets of data: flow data, and position/stock data. See ibid 4–5. For a description of the main uses of these data elements in identifying relevant trends and risks in global securities financing markets, see ibid 34–37.

[140] Most of these elements are present in the three covered markets, i.e. repos, securities loans, and margin loans. However, in some cases, the definition of the elements might vary from one market to the other. For a detailed overview of the different elements to be collected in each of these markets, see FSB, 'Transforming Shadow Banking into Resilient Market-Based Finance. Standards and Processes for Global Securities Financing Data Collection and Aggregation' (n 155) 3–18.

provide global trends.[141] The report also includes a series of recommendations for national/regional data collections.[142]

Even more recently, on 23 February 2016, the FSB published a new consultative document where it proposed possible measures of non-cash collateral re-use.[143] Although the FSB expects to finalise this new framework by the end of 2016,[144] as of December 2016, the FSB had not issued any additional documentation. When that happens, the new data elements could potentially be included in the global securities financing data standards proposed in the November 2015 report.[145] In addition to the data elements enumerated in the November 2015 report, the February 2016 report also included the requirement for the collateral provider to report the proportion of posted collateral that it re-uses.

Most of the proposals put forward by the FSB are rather recent and regulators in the U.S. and the U.K. have only started to implement them. For example, in the U.S., the Office of Financial Research (OFR), in cooperation with other U.S. authorities, has launched a pilot project that aims to fill data gaps in bilateral repo markets.[146] The reporting template includes numerous data elements, including the value of the portfolio holding that is on loan.[147] In the U.K., the main regulatory

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[141] For a detailed description of the data architecture, see ibid 19–31.

[142] See ibid 32–33. Start of reporting by national/regional authorities is expected for 2017-18. See ibid 39.

[143] See FSB, 'Transforming Shadow Banking into Resilient Market-Based Finance. Possible Measures on Non-Cash Collateral Re-Use' (2016).

[144] See ibid 2.

[145] See ibid.

[146] According to the OFR, 'participation in the pilot project was voluntary, and participating companies provided input on what data should be gathered.' Office of Financial Research, 'Bilateral Repo Data Collection Pilot Project' (*Data & Standards*) <https://financialresearch.gov/data/repo-data-project/> accessed 31 March 2016.

[147] The template contains twenty-six different data elements. The template is available at ibid. On 13 October 2017, the SEC issued the "Investment Company Reporting Modernization; Final Rule", 81 Fed. Reg. 81870, which responds to the mandate under Section 984(b) Dodd-Frank Act that called on the SEC to develop new rules 'to increase the transparency of information available to brokers,

initiatives have been taken at the E.U. level. For example, the Transparency of SFTs Regulation will require market participants to report SFTs to trade repositories on a progressive basis between mid-2018 and mid-2019,[148] including data elements such as the availability of collateral for re-use, the extent to which it has been re-used, cash collateral re-investment practices, and securities lending activities.[149]

Unlike in the case of SFTs, regulatory initiatives in relation to reporting and data collection in the OTC derivatives market are scarce. In January 2012, the Committee on Payment and Settlement Services (CPSS)[150] and IOSCO published a report on OTC derivatives data reporting.[151] Among other things, the report specifies minimum requirements for reporting data to a trade repository and for the reporting by a trade repository to regulators, as well as types of acceptable data formats. It also advocates for the collection of the terms that govern the master agreements and credit support annexes that market participants use to document their derivative transactions.[152] The CPSS/IOSCO report identified a series of "minimum reporting" elements. [153] Data elements relating to collateralisation were categorised as "additional reporting" requirements that authorities could require from market

dealers, and investors, with respect to the loan or borrowing of securities.' Among the many data elements to be reported, the proposed rules include the name of each counterparty, the aggregate value of all securities on loan to each, and the value of the portfolio holding that is on loan, that represents non-cash collateral, and that represents an investment of cash collateral.

[148] See Transparency of SFTs Regulation, arts 4(1), 33(2)(a). The Regulation further provides that some data on collateral re-use be provided in the UCITS half-yearly and annual reports and the AIF's annual report; in particular: '[s]hare of collateral received that is reused, compared to the maximum amount specified in the prospectus or in the disclosure to investors; [and] [c]ash collateral reinvestment returns to the collective investment undertaking.' Transparency of SFTs Regulation, Annex.

[149] For a more elaborate list of the basic data elements to be reported, see Transparency of SFTs Regulation, art 4(9).

[150] The CPSS has been recently renamed as the Committee on Payments and Market Infrastructures.

[151] CPSS and IOSCO, 'Report on OTC Derivatives Data Reporting and Aggregation Requirements' (2012).

[152] See ibid 18.

[153] See ibid 37. Some of those minimum reporting elements included the identification of the reporting entity and its counterparty, the primary economic terms of the transaction, and the type of master agreement used to document the transaction.

participants. Nevertheless, none of these elements included aspects directly related to collateral re-use.

Regulations that implement the recommendations of the CPSS and IOSCO in the U.S. and the U.K. do not cover many of the aspects relating to collateral re-use either. For example, in the E.U., article 9 of EMIR requires that counterparties and CCPs report the details of any derivative contract they have concluded, modified or terminated to a registered trade repository. However, standard reporting forms presented by the European Commission only cover very few elements relating to collateral and do not cover collateral re-use at all.[154] In the U.S., the CFTC Final Rules on Swap Data Recordkeeping and Reporting Requirements[155] require market participants to report certain primary economic data, including whether the transaction has been collateralised and to what extent, e.g. 'uncollateralized, partially collateralized, one-way collateralized, fully collateralized', but do not mention collateral re-use.[156]

The BCBS and IOSCO have set up a monitoring group that will evaluate their proposed margin standards for bilaterally cleared derivatives. This monitoring group is expected to gather data about 'the extent to which collateral is [re-used]', as well as 'any implementation issues and the benefits and risks of such [re-use]' in order to evaluate the need to review the restrictions on re-use proposed in the current policy

[154] For example, these forms do require that reporting participants specify whether their contracts are collateralised, whether such collateralisation was performed on a portfolio basis (i.e. whether collateral was calculated on the basis of net positions resulting from a set of contracts, rather than per trade), and the value of the posted collateral. See e.g. Table 1 in the Commission Delegated Regulation (EU) No 1247/2012 of 19 December 2012 [2012] OJ L 352/20. See also the Commission Delegated Regulation submitted on 19 October 2016, C(2016) 6624 final, which supplements EMIR.

[155] These Final Rules were published on 13 January 2012. See 77 Fed. Reg. 2136.

[156] Annex 1, Exhibit C, Minimum Primary Economic Terms Data for Interest Rate Swaps (including cross-currency swaps), 77 Fed. Reg. 2219.

framework.[157] However, as of December 2016, no details about the specific data elements that will be collected have been made publicly available. Moreover, regulators in the E.U. and in the U.S. have not launched any initiatives to improve data collection in this regard. The ECB has recently started collecting data on credit terms and conditions in euro-denominated SFTs and bilaterally cleared derivatives in a series of termly surveys, but these do not provide information on collateral re-use practices.[158]

Table 7.4 provides a summary of the main data collection initiatives, including their scope, data elements, and the institutions responsible for data collection.

Table 7.4. Improving the understanding of collateral re-use: initiatives

| Reform | Market | Data elements | Collection |
|---|---|---|---|
| Global Securities Financing Data Collection | SFTs | Type of contract, counterparty, sector, type of collateral, haircuts, collateral market value, re-use eligibility | Two tiers: i) national or regional; ii) FSB |
| Measures of non-cash collateral re-use | SFTs | Above + collateral actually re-used | FSB |
| Data Collection Pilot Project | Bilateral repo | Value of securities portfolio on loan | OFR |
| SESFOD Survey | SFTs | No data on re-use. | ECB |
| | B.c. derivatives | | |
| Trade data reporting | OTC derivatives | Basic data on collateral. No data on re-use. | Trade repositories |

Improving the access of supervisors to data on collateral re-use would allow them to better understand collateral re-use practices in SFTs and OTC derivatives

[157] See BCBS and IOSCO (ch 1, n 63) 6.

[158] For the September 2016 SESFOD survey and a copy of the survey guidelines, see ECB, 'Results of the September 2016 SESFOD Survey' (*Press Releases*, 14 October 2016) <https://www.ecb.europa.eu/press/pr/date/2016/html/pr161014.en.html> accessed 2 January 2017.

markets, and their systemic implications. Moreover, access to more detailed data about collateral re-use practices would also permit regulators to monitor compliance with the proposed regulatory reforms, to analyse the effects of their implementation on the market structure, and, in light of such effects, to evaluate the possibility of adapting the regulation, for example, to address new systemic risks. Opacity, in this sense, is not socially desirable.[159]

Nevertheless, the reporting and data collection initiatives described above face important limitations. Most evidently, some of them include a range of data elements that will only provide an incomplete picture of collateral re-use practices. For example, the FSB's February 2016 report does not require participants in SFTs markets to provide information about important elements such as i) whether the institution is reporting as a collateral provider, a collateral taker, or a custodian; ii) the identity of its counterparty; and iii) the amount of collateral that has *actually* been re-used, in contrast to the amount of collateral that is eligible for re-use. In the context of OTC derivatives, initiatives hardly require market participants to provide any information about collateral re-use at all.

Moreover, market participants that will need to comply with these new reporting requirements will incur additional costs for the collection and organisation of data in order to meet regulatory requirements. Although in the pursuit of reducing systemic risk these costs need not deter regulators from developing their data collection efforts, ideally, regulators will try to minimise these costs when designing new reporting processes. Regulators should also bear in mind that managing and

[159] Holmström acknowledged the importance of dealing with systemic risk that may build up because of the lack of information and the weak incentives to be concerned about panics. In this sense, he admitted that there would need to be some transparency about some types of information. He specifically cited 'aggregate statistics, especially gross characteristics such as volumes of trade and amounts of different types of assets on balance sheets'. Holmstrom (n 60) 39. Judge has also argued that the only way of reducing systemic risk in the SFTs markets is by improving the understanding of the risks, i.e. by filling the information gaps. See Judge (ch 6, n 40) 6.

analysing big sets of new data will require the relevant supervisors to be adequately resourced. In the recent past, new data collection efforts in the OTC derivatives market have cast doubt on the ability of supervisors to handle the resulting size and number of data sets.[160] If supervisors are not able to manage these new sets of information, the data collection and reporting efforts will have been in vain.

Another potential cost of these reporting and data collection initiatives is the restriction of data flow across sectors and borders. Under current market practices, the unfettered right to re-use collateral allows collateral takers to transfer collateral received in one type of transaction, e.g. a repo, to meet its obligations under a different type of transaction, e.g. an OTC derivative. In other words: collateral chains can grow across different markets. The efficacy of data collection initiatives in improving the monitoring and understanding of systemic risks associated with collateral re-use will ultimately depend on the collaboration between different supervisors responsible for the overview of the relevant markets. Given the transnational character of SFTs and OTC derivatives markets, the efficacy of those data collection efforts will also depend on the level of collaboration between supervisors in different jurisdictions.[161]

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[160] See e.g. Philip Stafford, 'Europe Learns from CFTC on Trade Reporting' *Financial Times* (11 November 2013) <https://www.ft.com/content/def062e0-4ab3-11e3-8c4c-00144feabdc0> accessed 19 November 2016.

[161] Before the 2007-08 financial crisis, there were isolated efforts to promote cross-border cooperation between financial supervisors in certain sectors. See e.g. IOSCO, 'Multilateral Memorandum of Understanding Concerning Consultation and Cooperation and the Exchange of Information' (2002) <https://www.iosco.org/library/pubdocs/pdf/IOSCOPD386.pdf>. In the aftermath of the 2007-08 financial crisis, national financial supervisors have redoubled their efforts to improve coordination and information exchange amongst themselves. See e.g. BCBS, 'Principles for Effective Risk Data Aggregation and Risk Reporting' (2013) <http://www.bis.org/publ/bcbs239.pdf>. The BCBS, for example, has called for the consolidated supervision of international banking groups. See Principles 24 and 25 in BCBS, 'Core Principles for Effective Banking Supervision' (2012) <http://www.bis.org/publ/bcbs230.pdf>. Supervisory "colleges" that gather representatives from both the home and host supervisors of an international banking group enhance the potential for cross-border cooperation even further. For example, these supervisory colleges represent a central part of the European Banking Union. See e.g. Council Regulation (EU) No. 1024/2013 of 15 October 2013

Finally, regulators should also take into account the costs associated with the possibility of sensible data being leaked to the market. If any of the data elements that market participants will need to report is considered to include sensitive information, regulators will need to ensure that these elements are reported on a confidential basis.

## III. Looking ahead

In the previous Section, I described in detail how different regulatory initiatives that aimed to address some of the concerns with systemic risk in SFTs and OTC derivatives markets that arose after the financial crisis will affect the way collateral is re-used in these markets. Although these regulatory initiatives address some of the concerns raised in Chapters 5 and 6, they only do so partially, as indirect restrictions on collateral velocity in SFTs markets; or if they do address them fully, e.g. with a complete ban on the re-use of initial margin in the bilaterally cleared derivatives markets, the potential costs associated with it cast doubt on their desirability. In this Section, I will present four proposals that the relevant international bodies, as well as regulators in the E.U. and the U.S., could use as a future reference to complement existing and prospective regulation in the SFTs and OTC derivatives markets in order to minimize the effect of collateral re-use on systemic risk.[162]

("SSM Regulation") [2013] OJ L 287/63, art 4(1)(g). Moreover, the LEI initiative is an example of possible ways in which supervisors can improve the comparability of the data they collect. See n 204.

[162] There are other alternative proposals. For example, regulators in the E.U. and the U.S. could retract their complete ban on re-suing initial margin in bilaterally cleared derivatives and stick to the more moderate proposals presented by the BCBS and IOSCO. These regulations have just been finalised, however; and the political viability of such a recommendation today seems rather small. I have thus preferred to focus my attention on more realistic regulatory proposals.

## A. Restricting the amount of re-usable assets

In the previous Section, we saw that, in the U.S., the SIPA prevents prime brokers from re-using clients' assets the value of which exceeds 140% of the client's liabilities vis-à-vis the prime broker. The main criticism of this rule was that the statutory limitation would still leave the collateral provider with a relatively large unsecured claim –40% of her liabilities–, and thus would seem inadequate to reduce the collateral provider's incentives to run from an ailing over-collateralised collateral taker. In this sense, regulators in the E.U. and the U.S. could consider the introduction of a statutory limitation that allows the collateral taker to re-use only received collateral assets with a value of 100% of the collateral provider's liabilities.[163] Any assets the value of which exceeds 100% of the collateral provider's liabilities would have to be segregated and would not be eligible for re-use. The collateral taker would offer the collateral provider to segregate those assets in an omnibus or an individual account.

The effects of applying this "100% restriction" to bilaterally cleared derivatives will lead to similar outcomes than the ones that arise under the regulatory measures that have been recently approved in the E.U. and the U.S.: market participants will only be allowed to re-use those collateral assets that are posted as

[163] A restriction of 100% might impair the ability of securities dealers to play an intermediary role. For example, if a customer transfers a securities portfolio with a market value of £150 as collateral to its dealer under a bilateral repo, with a Purchase Price of £99 and a Repurchase Price of £100, a 100% restriction would only allow the dealer to re-use securities from the portfolio with a market value of £100. The dealer may not be able to sell that portion of the portfolio for £99 in the tri-party repo market to fund the bilateral repo with its customer. An alternative proposal would be to allow the dealer, as collateral taker, to re-use as much collateral as necessary to raise the necessary funds for its intermediary role. In our example, the dealer would be allowed to re-use the portion of the securities portfolio that would allow the dealer to raise the £99 in the tri-party repo market. Because the dealer will normally be more creditworthy than its customer, the former will not need to re-use the whole securities portfolio to raise the necessary funds. Any securities collateral remaining in the portfolio will be segregated to protect the customer's proprietary interest.

variation margin.[164] Regulators, however, have not recommended a similar restriction in relation to SFTs.

Despite the similarities with recent regulatory reforms in the OTC derivatives market, regulators may want to consider taking this regulatory measure a couple of steps further. First, regulators in the E.U. and the U.S. may want to consider extending these restrictions on collateral re-use to centrally cleared OTC derivatives. Current market practices suggest that the re-use of securities collateral by CCPs is a rare phenomenon.[165] However, increasing competition among CCPs is putting pressure on them to increase the return on their activities. At the moment, CCPs are competing in margins to attract more business.[166] Yet, regulatory floors for margins limit the extent of competition in this regard. In the future, we could see CCPs turning to collateral re-use as a means of improving their profitability.[167]

Moreover, the BCBS/IOSCO policy framework limits the applicability of the proposed restrictions to collateral assets posted as initial margin. Implementing regulation in the E.U. and the U.S. does permit the re-use of cash collateral posted as initial margin, but it does not restrict the re-use of securities collateral posted as

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[164] Assuming that variation margin requirements aim at securing the collateral taker's full exposure.

[165] For a detailed analysis of collateralisation practices in the centrally cleared derivatives market, see Chapter 3, Section III.

[166] Roger Liddell, chief executive of Europe's largest independent clearing house, LCH.Clearnet, criticised the risk management policies of his US rival, International Derivatives Clearing Group, for being "much more lenient" with its margin policy than the London-based clearer. Quoted in Jeremy Grant, 'Quick View: LCH.Clearnet versus IDCG' *Financial Times* (16 April 2010) <https://www.ft.com/content/10ada5fc-493e-11df-8e4f-00144feab49a> accessed 2 January 2017. See also Telis Demos, 'ISDA Warns against Competing Clearing Houses' *Financial Times* (1 May 2012) <https://www.ft.com/content/e1eb0644-93a8-11e1-baf0-00144feab49a> accessed 2 January 2017.

[167] It should be noted, however, that current regulatory capital requirements are designed to discourage the CCP from re-using collateral. In the E.U., for example, under article 306 of the CRR, members of a CCP may incur a 2% regulatory capital charge if they transfer collateral assets under a TTCA or a SICA that grants the CCP a right to re-use. See Yeowart and Parsons (ch 1, n 62) 20.56. An express restriction, as suggested in this paragraph, would further reduce the incentives of CCPs to rely on collateral re-use.

variation margin.[168] Regulators could consider extending restrictions on re-use to securities collateral posted as variation margin in bilaterally cleared derivatives.[169] The ability of market participants to re-use securities collateral posted as variation margin could give rise to the same systemic risks that I described in Chapters 5 and 6. That market participants do not currently rely on securities collateral to meet their variation margin requirements does not mean that this market practice will remain unchanged in the future.[170]

In the context of SFTs, the "100% restriction" would require further regulatory action. For example, the FSB could recommend that a similar restriction to the one currently applicable to prime brokers under SIPA in the U.S. be extended to all collateral takers in the SFTs markets across different jurisdictions, albeit with a lower percentage.[171] Such a harmonisation initiative would contribute towards the avoidance of problems associated with regulatory arbitrage.[172]

Due to the application of close-out netting mechanisms, the 100% restriction would eliminate the incentives of collateral providers to run from over-collateralised collateral takers in the SFTs and OTC derivatives markets. In the case of SFTs markets, regulators may want to consider requiring collateral takers to segregate any

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[168] See Section III.A.2.

[169] In centrally-cleared OTC derivatives, market participants can only post cash collateral to meet variation margin requirements. Alternatively, regulators could require participants in bilaterally cleared markets to post only cash collateral as variation margin, like regulators do in the context of centrally cleared derivatives markets.

[170] For a detailed analysis of collateralisation practices in the bilaterally cleared derivatives market, see Chapter 3, Section II.

[171] The restriction in SIPA is for 140%.

[172] The fact that different jurisdictions had different limits on re-use already seemed to be a concern for the FSB. See n 118. These concerns probably stem from the different treatment that clients of the U.K. and U.S. arms of Lehman Brothers received after the firm's collapse in September 2008. However, as of December 2016, there have been no harmonisation proposals. Ideally, such harmonisation will also span the re-use of collateral assets under financial services other than prime brokerage.

over-collateralised amount to enhance the protection of the collateral provider.[173] In addition, this restriction, on its own, would also put an indirect cap on collateral velocity. In the absence of any additional restrictions, the same asset could be re-used *ad infinitum*; but the fact that not all posted collateral will be eligible for re-use puts a limit to the overall amount of re-use in the system.[174]

A "100% restriction" would inevitably hinder some of the positive externalities associated with an unfettered right to re-use. For example, it would affect the ability of financial intermediaries to rely on *all* received collateral to fund their own activities; particularly if the purpose of re-use is restricted, as the FSB has recommended for SFTs, and as regulators in the E.U. and the U.S. have specified for bilaterally cleared derivatives. It would also reduce the circulation of collateral in the system, thereby reducing the size of SFTs and bilaterally cleared derivatives markets, and potentially undermining credit and economic growth. Nevertheless, that negative impact would be much smaller than the one associated with alternative strategies such as a complete ban on re-use.

## B. Restricting the scope of re-usable assets

In order to reinforce the protection against systemic risk, in addition to the proposed restriction on the amount of received collateral that can be re-used, regulators could also consider a restriction on the scope of assets that are eligible for re-use

[173] Such a measure already exists in the context of OTC derivatives markets; at least in the bilaterally cleared derivatives markets.

[174] The amount of collateral in the system that is available for re-use is inversely proportional to collateral velocity. For example, let us suppose that one collateral provider transfers collateral assets with a value of £125m to secure an obligation of £100m, and that the collateral taker is only allowed to re-use collateral assets worth £100m. If the latter re-uses those assets to secure an obligation of £90m, under the 100% restriction, the second collateral taker will only be allowed to re-use collateral assets with a value of £90m. the amount of assets that will be eligible for re-use will continue to decrease progressively as the same portfolio of assets is re-used.

(hereinafter, "re-usable" assets) under SFTs and OTC derivatives contracts. For example, regulators could restrict re-usable assets to those that are highly liquid, that have a low credit risk, and that show relatively low volatility.[175] This type of assets as often referred to as "high quality liquid assets", or HQLA.[176]

This "re-usability" restriction would effectively concentrate the amplification effects of collateral re-use on assets that are less prone to price volatility and, thus, less prone to triggering virulent margin calls.[177] Moreover, because HQLA will normally bear a lower haircut, this re-usability restriction could reduce the amount of the collateral provider's unsecured claim in the event of the collateral taker's insolvency, thereby reducing the collateral taker's over-collateralisation and the collateral provider's incentives to run.

The proposal could face several criticisms. First, market participants will have an incentive to rely more on re-usable HQLA as collateral to benefit from the advantages of re-use; mainly, the re-use premium.[178] Thus, on its own, the restriction

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[175] This "re-usability" restriction shares some underlying concerns with recent proposals to curtail the scope of bankruptcy safe harbour provisions in the U.S. For example, some commentators have proposed that the scope of bankruptcy safe harbours in the U.S. is narrowed to cover only those SFTs that are collateralised by HQLA; mainly, certain U.S. Treasury securities. See Edward R Morrison, Mark J Roe and Christopher S Sontchi, 'Rolling Back the Repo Safe Harbors' (2014) 69 The Business Lawyer 1015.

[176] The term is particularly popular in the context of bank capital and liquidity requirements under the Basel II Accords. See Section III.B.1.a.

[177] In Chapter 5, I described virulent margin calls as those that arise simultaneously, or almost so, along a given collateral chain as a result of the occurrence of one specific event. Typically, changes in the price of the collateral asset that supports a collateral chain will have a high probability of leading to virulent margin calls. Changes in the creditworthiness of one of the participants along the chain, however, will have a lower probability of triggering virulent margin calls.

[178] Restricting the scope of re-usable assets will increase the demand for those assets that are classified as eligible for re-use and bring down their price. As a result, re-usability can help some governments market their debt if their bonds are included in the list of re-usable assets. This could be seen as an indirect interest rate subsidy that could lead to moral hazard problems. The overall effect on the price of those re-usable assets, however, is unclear. For example, despite the said indirect subsidy, issuers of HQLA may be unable, or unwilling, to meet the increased demand. Direct and indirect restrictions on collateral velocity may lead to shortages of HQLA. In that case, the price of HQLA may be exposed to an upward pressure that could compensate the indirect subsidy. The proposal described in the previous section, however, i.e. to restrict the amount of assets that will be eligible for re-use, would reduce the probability of such shortages given that collateral takers could re-use HQLA up to a 100% of their exposure.

could lead to greater levels of collateral velocity. An even greater multiplication effect could lead to an even greater amplification of AVC effects than in a situation where the range of re-usable assets is broader. Yet, direct or indirect restrictions on collateral velocity such as those proposed by the FSB, and the BCBS and IOSCO, or a restriction of the amount of re-usable assets, as described in the preceding sub-section, could be of help in containing that risk.

In addition, greater reliance on re-usable HQLA could result in high concentration levels, where a large proportion of market participants will rely on the same collateral assets. If the price of any of those assets experienced unusual changes, these high concentration levels could lead to very large asset value contagion effects; larger than in a situation where the list of re-usable assets is much broader. The greater quality of the HQLA lowers the probability that such abrupt changes in prices will occur, but the concentration risk also magnifies the scope of the potential systemic effect were that risk to occur. The recent sovereign debt crisis in the Eurozone is a reminder that even those assets that markets regard as some of the safest can experience periods of extraordinary volatility, and even be subject to sharp and deep price declines. Nevertheless, existing restrictions on collateral velocity or the proposed restriction on the amount of received collateral that can be re-used could help contain this risk.

Finally, the overall effect of this "re-usability" restriction on run risk may be, at least, unclear. Although, in principle, a lower haircut might reduce the collateral taker's over-collateralisation, she can also request that additional margin be posted as a result of changes in other factors, e.g. the collateral provider's solvency. In addition, in a crisis scenario, the appeal of HQLA could counteract the effect of lower haircuts on run incentives: a re-usability restriction could give collateral

providers an even stronger incentive to recover their posted collateral from their over-collateralised collateral taker to avoid losing their HQLA in a potential insolvency proceeding. In this case, however, the application of the proposed restriction on the amount of received collateral that can be re-used would ensure regulators that the run risk is mitigated. Allowing collateral takers to re-use received HQLA with a market value of 100% of their exposure would also mitigate the potential effects of a reusability restriction on the availability of collateral assets to support credit transactions.

### C. Restricting the scope of the collateral taker's right to re-use

Regulators may be reluctant to restrict the amount of received collateral that will be eligible for re-use, particularly in the SFTs market, where the FSB proposals have taken a milder stand than those presented by the BCBS and IOSCO in the bilaterally cleared derivatives market. One of the alternative options available to regulators would be to restrict the scope of the right to re-use to a narrower form of disposal, e.g. re-hypothecation. In Chapter 1, I defined re-hypothecation as the creation of a "qualified" sub-security interest, i.e.: the collateral provider consents to the collateral taker creating a security interest in the property to secure an obligation that is larger than the former's, but without relinquishing its proprietary rights in the assets. Because the collateral provider will retain her proprietary interest in the collateral assets, the re-hypothecation of collateral could reduce her incentives to run on the original collateral taker. Moreover, because the second collateral taker will have priority over the collateral provider in the event of the original collateral taker's default, this restriction need not lead to a restriction of collateral velocity. Therefore,

the positive effects associated with collateral re-use –mainly, lower cost of capital and promotion of credit and economic growth– need not be impaired.

It is important to note, however, that if the original collateral taker re-hypothecates the collateral assets and the second collateral taker files for insolvency, tracing the assets in order to unwind the collateral chain can face some difficulties; particularly if the re-hypothecated assets are of a fungible nature, e.g. cash or securities. In this sense, requiring that both the original and the second collateral taker segregate the collateral assets, as the BCBS and IOSCO proposed for bilaterally cleared derivatives, could solve the problem.[179] An individual segregation would be preferred for additional protection.

Given that the collateral provider would retain her proprietary interests, participants in SFTs markets may no longer be able to rely on TTCAs and may have to rely on SICAs instead. This need not lead to dramatic changes in market practices. In the E.U., the FCD effectively assimilates SICAs and TTCAs, including their protection from the application of automatic stay and avoidance provisions.[180] In the U.S., the scope of these bankruptcy safe harbour provisions is defined by statutory definitions of specific financial products.[181] If the use of SICAs in the U.S. is deemed incompatible with these statutory definitions, legislators could amend them to guarantee the existing level of protection.

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[179] It is important to note, however, that if it is the collateral taker the one who files for insolvency, the second collateral taker will be entitled to realise the collateral to the detriment of the collateral provider's proprietary interest. That risk, however, is implicit in the right to re-hypothecation.

[180] In the U.K., custody rules under the FCA rules would apply. See CASS, rr 3.1.3 R, 6.1.6 R. It is important to note, however, that the FCA rules define re-hypothecation in the broad sense of "re-use", as described in Chapter 1 of this dissertation. See e.g. CASS, r 3.1.4 G. Technically, the right to re-hypothecation is narrower in scope: it allows the collateral taker to create a "qualified" sub-security interest without the collateral provider relinquishing her proprietary interest in the collateral assets. In this section, I propose to restrict the scope of the collateral taker's right to re-use to this narrower category. Chapter 1 provides a more detailed discussion of the differences between a sub-security, a right to re-hypothecation, and a broader right to re-use.

[181] Chapter 4 examines in greater detail the differences in the regulatory approaches to safe harbours in the E.U. and the U.S.

Nevertheless, on its own, the re-hypothecation of collateral will not reduce the multiplication effect that threatens to amplify AVC effects. As we saw in the preceding sub-section, the "re-usability" restriction would face problems of its own in this sense; mainly, the possibility of even greater velocity for re-usable assets, and concentration risks. Regulators would need to rely on complementary measures to curtail these effects. In this sense, the functional restrictions recommended by the FSB, which impose an indirect limit on collateral velocity, or the proposal to limit the amount of collateral assets that will be eligible for re-use to 100% of the collateral taker's exposure, could help contain the multiplication effect.

### D. Improving the reporting and data collection initiatives

The effectiveness of any policy strategy aimed at reducing the systemic risk implications of collateral re-use will inevitably depend on regulators' and supervisors' understanding of how market participants re-use collateral in the SFTs and the OTC derivatives markets. The FSB, and BCBS and IOSCO, as well as regulators in the E.U. and the U.S., have acknowledged this need and have promoted initiatives to improve reporting and data collection in these markets. Unfortunately, however, the extent to which these initiatives will produce data that will allow regulators and supervisors to improve their understanding of collateral re-use and its possible systemic implications is doubtful, particularly in the context of OTC derivatives, where little information about collateral re-use will be collected.

In order to gain a better understanding of collateral re-use practices in SFTs and OTC derivatives markets, regulators could require market participants to report several aspects of their re-use practices to the relevant supervisors. The first aspect is the type of financial collateral arrangements that they use, i.e. whether they are based

on the transfer of full title over the collateral or the grant of a security interest, and, in the latter case, the scope of any right to re-use.[182] Supervisors would also need to know what type of contract the financial collateral arrangement is supporting. To facilitate the aggregation and comparability of data, this latter category need not be very specific: participants may report the general category of the transaction, e.g. a repo contract, a securities loan under a prime brokerage agreement, a derivatives contract, or a sale contract. This would allow supervisors to know in which market the collateral was originally posted.

The second aspect is the specific type of assets that are posted (received) as collateral. This would allow supervisors to understand what types of collateral assets are in greater demand and which ones do market participants re-use the most. In addition, regulators could require that market participants report whether the collateral is subject to any haircuts, whether it is posted (received) as variation margin or initial margin –where applicable–, whether such margin is posted on a unilateral or bilateral basis,[183] and whether it is posted on a gross or net basis. All these elements would allow supervisors to evaluate the degree to which the collateral taker may have an over- or under- collateralised exposure.

The third aspect would be the proportion of assets received as collateral that are eligible to be re-used, how many of those assets are actually re-used, and to what extent. For example, a collateral taker that receives collateral under a TTCA may decide to simply grant a security interest in the collateral despite of the broader scope of her right. The collateral provider would also have to report whether the posted

[182] Under a TTCA, the collateral taker receives a broad right to re-use. However, it is important to remember that under a SICA, the parties can agree that the collateral taker will hold different rights of re-use over different collateral assets, e.g. the right to dispose of some and only the right to re-hypothecate others.

[183] In other words: whether both parties are obliged to post variation or initial margin (bilateral margin) or whether only one of them is obliged to do so (unilateral). For an overview of current margin practices in the OTC derivatives markets, see Chapter 3.

collateral is being re-used. All these data elements would permit supervisors to identify the proportion of the assets that are being re-used as a source of leverage, assess the probability of a run risk occurring, and apply the relevant capital and liquidity regulatory requirements. Moreover, these data elements would allow supervisors to understand how collateral re-use may interconnect participants in securities financing and derivatives markets.

In order to minimise the costs of supervision and guarantee the effective monitoring of collateral re-use, regulators could restrict the scope of these reporting requirements to those institutions that are particularly likely to re-use securities collateral: in the OTC derivatives markets, derivatives dealers; and in the SFTs markets, repo lenders, particularly those that have been designated as global systemically important banks (G-SIBs) and insurers (G-SIIs).[184]

For each financial collateral arrangement, each reporting institution would need to report the institution that they are re-using the collateral with. If collateral takers are holding collateral with a third party custodian, such custody arrangements should also be reported by the collateral taker and the custodian institution, detailing the same information that has been described above, including, in particular, whether the custodian has any right to re-use the securities collateral and, if so, to what extent.[185]

[184] Dealer banks and insurance companies are among the largest repo lenders; the former in the bilateral repo market, and the latter in the tri-party repo market. For an updated list of the G-SIIs and G-SIBs, see nn 79, 90, respectively.

[185] Custodians can re-use their clients' assets with the latter's consent. See e.g. FUND, r 3.11.24 R. Extending the scope of these reporting requirements to custodian banks will allow supervisors to understand the actual extent to which custodians engage in collateral re-use.

If regulators wanted to address the lack of detail of the existing reporting and data collection initiatives in SFTs and OTC derivatives markets described in the previous section, they could use Table 7.5 as guidance to design comprehensive market surveys or reporting forms. As we can see from the Table, the coverage of these three aspects would require supervisors to collect several data elements: i) name of the reporting institution;[186] ii) whether it is reporting as a collateral provider, a collateral taker, or a custodian; iii) the identify of their counterparty;[187] iv) the type of financial contract that is collateralised; v) the type of financial collateral arrangement; vi) if a SICA, the scope of the collateral taker's right to re-use; vii) a series of elements about the collateral asset (type, market value, haircut); viii) whether it is posted as variation or initial margin –where applicable–; ix) what proportion of the assets is eligible for re-use; and x) the actual amount that has been re-used.

[186] A global initiative coordinated by the FSB will permit different market participants to identify themselves using a Global Legal Entity Identifier (LEI). See Global Legal entity Identifier Foundation, 'Introducing the Legal Entity Identifier (LEI)' (*About GLEIF*) <https://www.gleif.org/en/lei-focus/introducing-the-legal-entity-identifier-lei> accessed 12 August 2016. This initiative will introduce some degree of harmonisation that will permit data collection efforts to be shared between supervisors in different countries. Ideally, this type of initiative would develop further to introduce unique product identifiers for every type of financial claim. At the moment, however, we are far from the implementation of a global LEI/PI system. See Armour and others (ch 2, n 36) 629.

[187] See n 203.

Table 7.5. Improving the understanding of collateral re-use: model form

| REPORT ON COLLATERAL RE-USE | |
|---|---|
| 1. Name of reporting institution: | |
| 2. Reporting as: | [CT/Custodian].[1] |
| 3. Name of counterparty: | |
| 4. Type of contract supported: | *E.g. ISDA Master Agreement.* |
| 5. Type of financial collateral arrangement (FCA):<br>○ Title Transfer Collateral Arrangement (TTCA).<br>○ Security Interest Collateral Arrangement (SICA): right to re-use?<br>• No<br>• Yes:<br>▪ Full disposal<br>▪ Re-hypothecation | |

6. Re-use[2]

| Type of collateral | Haircut (%) | Posted as | | Scope re-use | Market Value | Eligible | Eligible (%) | Actually re-used (CT)[3] |
|---|---|---|---|---|---|---|---|---|
| | | VM | IM | | | | | |
| *Gilts (1yr)* | *3%* | | ✓ | *Full* | *1m* | *1m* | *100%* | *1m* |
| | | | | | | | | |
| | | | | | | | | |

[1] A reporting institution will be deemed a CT if on the reporting day she holds collateral assets from her counterparty, particularly if the collateral to be transferred under the supported master agreement is calculated in accordance with a netting agreement to support different transactions falling within the same master agreement.

[2] An example of a hypothetical transaction where 1-year Gilts have been transferred as initial margin under a FCA that grants the collateral taker a broad right to re-use. All the Gilts have been re-used.

[3] Total value of the assets re-used by the CT that day (if the reporting institution is a CT).

Ideally, reporting would be performed on a daily basis. Despite recommendations to mark their positions to market as frequently as possible (e.g. on a daily basis) in the run-up to the 2007/08 crisis,[188] many market participants did not, setting weekly and monthly valuation dates.[189] In the aftermath of the 2007-08

[188] See e.g. ISDA, '2005 ISDA Collateral Guidelines' (2005).

[189] For example, for an overview of common valuation practices in the OTC derivatives markets, see Chapter 4.

financial crisis, regulators have aimed to make daily valuation a standard practice.[190] Requiring market participants to report this information on a daily basis could serve as an additional incentive to adopt daily valuation. Participants could then use the information from those internal valuations to report to the relevant authorities.

Collecting the data elements identified in Table 7.5, regulators would gain a better understanding of the practise of collateral re-use in SFTs and OTC derivatives markets that would allow them to monitor market participants' compliance with any new or proposed restrictions on collateral re-use, as well as the impact of these restrictions on current market practices and market behaviour. Moreover, this information would allow regulators to evaluate the possibility of reviewing any existing restrictions and to devise new policy strategies to tackle future manifestations of systemic risk.

The collection and reporting of these data elements is likely to translate in additional costs for market participants; especially if different supervisors use their own reporting templates. However, supervisors could use the template presented in Table 7.5 to design a standard reporting template in order to minimise reporting costs for firms.[191] Moreover, supervisors could aim to further mitigate compliance costs by seeking the collaboration of market participants to find ways in which the data

[190] For example, in the U.K., investment funds are required to value their positions, including those in OTC derivatives, on a daily basis and to provide this information to their investors. See e.g. COLL, rr 4.2.5C EU, 5.2.23 R (2)(a), 5.3.3B R, 5.6.7 R (8)(a), 5.6.17 G (5), 5.9.3 R (4)(a), and 6.12.4 G (5). If firms are required to inform their investors on a daily basis, the costs they would incur for reporting to supervisors on a daily basis will be mitigated.

[191] There are examples of standard reporting templates. For example, one of the initiatives that the FSB is developing to strengthen firms' risk data aggregation capabilities and risk reporting practices is a new common data template for global systemically important financial institutions (G-SIFIs). See FSB, 'FSB Data Gaps Initiative – A Common Data Template for Global Systemically Important Banks' <http://www.fsb.org/wp-content/uploads/r_140506.pdf> accessed 3 January 2017. For an overview of similar FSB initiatives, see BCBS, 'Principles for Effective Risk Data Aggregation and Risk Reporting' (n 178) 6.

elements can be easily identifiable given the terminology that is included in standard market documentation.

Some of the data elements identified on Table 7.5 would allow supervisors to identify collateral flows between different markets.[192] The availability of this kind of information would allow supervisors to identify sources of systemic risk spanning different markets. However, effective use of this information would require the different competent supervisors to cooperate closely among themselves. In this sense, international bodies such as the FSB or the BCBS could play a fundamental role as fora where such collaboration can take place.[193]

Regulators must not ignore the costs that these reporting and data collection efforts would put on supervisors. In reality, the effectiveness of these reporting and data collection initiatives will ultimately depend on the ability of supervisors to manage the great amounts of data that market participants will generate. In this sense, regulators must make sure that supervisors have adequate resources to manage these data. Otherwise, all the costs inflicted upon market participants will have been in vain, and collateral re-use practices will continue to fog up our understanding of financial markets and systemic risk.

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[192] For example, reporting the type of transaction under which the received collateral will be re-used and the counterparty that will receive such re-used collateral will allow supervisors to identify whether re-used collateral is flowing across markets.

[193] In addition to current data reporting standardisation initiatives, the FSB and the BCBS/IOSCO could promote additional initiatives that would seek to create channels where information could be shared across sectors, and not only across borders. The International Data Hub set up by the FSB in the context of the common G-SIFIs template initiative is a good example in this regard. See FSB, 'FSB Data Gaps Initiative – A Common Data Template for Global Systemically Important Banks' (n 208) 3.

# IV. Conclusion

One of the main conclusions that arises from the dissertation is that the rationale behind the regulatory reforms that aimed to protect and promote the use of financial collateral in the U.S. and the E.U. was incomplete: it did not consider the systemic risk implications of the proposed reforms or, at least, it discarded them in the name of Pareto efficiency improvements. Legal scholars in the U.S. and the U.K. have illustrated these concerns in relation to the collateral taker's right to dispose of collateral immediately after the collateral provider has filed for insolvency.[194] Those regulatory reforms, however, also protected and promoted the right of the collateral taker to dispose of the collateral assets *before* the collateral provider has filed for insolvency. This dissertation illustrates how this right of the collateral taker to re-use collateral can also aggravate systemic risk.

In particular, the dissertation presents two major concerns with systemic risk. First, because the re-use of securities collateral will multiply the number of contractual claims that will be referenced to the same physical asset, it will aggravate asset value contagion effects, i.e. the role of prices as channels of contagion. Second, when the right to re-use requires the collateral provider to relinquish her proprietary rights in the securities collateral, if the collateral taker is over-collateralised, the collateral provider will have an incentive to run from the collateral taker. Collateral re-use can also accentuate that incentive by increasing the number of unsecured creditors in a hypothetical insolvency proceeding. The effect of collateral re-use on the collateral taker's assets need not be clear to unsecured creditors. If they are unable to assess the exact impact of collateral re-use on the insolvent estate, they will

[194] For a detailed list of academic studies, see Chapter 4, Section IV.

reasonably expect their pro rata share to be smaller and to try to anticipate any potential insolvency filing.

Perhaps more importantly, the dissertation illustrates how collateral re-use will make the collateral taker that exercises her right to re-use (the "re-user") particularly vulnerable to these risks. The exercise of her right to re-use will make the re-user stand both as a collateral taker (to the original collateral provider) and a collateral provider (to the second collateral taker) along the same collateral chain. This dual nature will expose the re-user to margin calls when the market value of collateral moves in *any* direction. Moreover, the re-user will be exposed to the credit risk of the second collateral taker if the former wants to avoid tapping her own resources to meet an obligation that is due. These two risks can expose the re-user to considerable liquidity pressure and will increase her probability of becoming insolvent.

This vulnerability also casts an important doubt on the general understanding of collateral re-use as a mechanism that enhances the functionality of collateral for the collateral taker, as described in Chapter 1. In particular, the collateral taker's exposure to the credit risk of the second collateral taker will hinder the ability of collateral to mitigate the former's counterparty credit risk. In essence, by re-using received collateral, the collateral taker would not only be transforming the collateral provider's credit risk into a series of new risks associated with collateral –i.e. legal, operational, market and management risks–, but also adding a new one: the credit risk of the second collateral taker. This insight could contribute to the long-standing academic debate about the desirability of secured lending that I mentioned in the Introduction to the dissertation.

Moreover, the implications of re-using collateral for systemic risk in SFTs and OTC derivatives markets will also cast doubt on the desirability of over-collateralisation as a proxy for counterparty credit risk in these markets, as defended by Gary Gorton, Bengt Holmström and others.[195] The conclusions reached in this dissertation do not challenge the role of over-collateralisation per se, as an effective mechanism to address information asymmetry problems that might hinder trading, but they illustrate the systemic risks that over-collateralisation can pose when coupled with the exercise of collateral re-use.

International bodies and national regulators are discussing different approaches to the regulation of collateral re-use in SFTs and OTC derivatives as I write these last few sentences. My hope is that this dissertation can contribute to these policy debates. I have described how recently proposed and implemented regulations will affect the way securities collateral is re-used in these markets. These proposals do address some of the concerns that I expressed in Chapters 5 and 6, but not completely. I have tried to provide practical advice as to how regulators could move forward to further reduce systemic risk stemming from collateral re-use while, at the same time, minimising some of the costs associated with the existing proposals.

The analysis in Chapters 5 and 6 is largely theoretical, and so remain the policy proposals that derive therefrom. The scarce data that is publicly available on collateral re-use practices in these markets impedes a more empirical analysis. Nevertheless, regulatory reforms that aim to contain systemic risk from collateral re-use, even if based on theoretical enquiries, should be welcomed. International bodies, and national and regional regulators, however, should prioritise the improvement of

[195] See e.g. Dang, Gorton and Holmström (ch 6, n 37); Judge (ch 6, n 40).

the quantity and quality of data on collateral re-use practices in these markets. That would give regulators the opportunity to review their most recent regulatory initiatives in order to improve the effectiveness of their efforts to contain systemic risk, and academics a good opportunity to test their theoretical enquiries against empirical data.

I started this project with a question in mind: can collateral re-use aggravate systemic risk? In my quest to provide a thorough answer, I have also identified a series of fascinating questions that I hope to explore in the future. For example, if the cost of re-using an over-collateralised amount is lower than the cost of other unsecured sources of finance for the collateral taker,[196] how can that affect the latter's incentives and financial structure? Can we rely on collateral providers, *de facto* unsecured lenders for such over-collateralised amounts, to monitor the re-user? If not, and if re-users will also over-collateralise the second collateral taker's exposure to make the claim information-insensitive, then who will monitor the re-user? How do these questions affect the idea of purposeful opacity for debt claims, defended by Gorton, Holmström and others?

But perhaps more broadly, the dissertation also raises interesting questions from a public law perspective. For example, the policy analysis that I have presented in this final Chapter relies on the assumption that financial stability is *the* regulatory priority. That, indeed, seems to be the spirit of the majority of regulatory initiatives in financial markets in the aftermath of the 2007-08 financial crisis. Yet, to date, normative questions about the role that financial stability ought to play in our legal systems remain largely unaddressed. Whether our memories of the recent financial

[196] If the collateral taker is over-collateralised, re-using collateral amounts to a hybrid loan from the collateral provider. One part of the loan is secured, effectively, by the obligations of the collateral provider vis-à-vis the collateral taker if the parties have agreed on a close-out netting mechanism that is enforceable. The other, i.e. the excess collateral, is unsecured. The re-use premium that the CT pays can be as low as 25bp. See Chapter 1, n 106.

crisis start to fade and we find our way into the next financial crisis, or whether the desire to avoid it leads central banks to venture further into "uncharted waters",[197] these normative questions will stand out as utterly important.

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[197] In April 2015, Mario Draghi, President of the ECB, used the term "uncharted waters" to describe the situation where the instruments legally available to the ECB to tackle the Eurozone sovereign debt crisis would not be enough. See Sam Fleming and Chris Giles, 'Draghi Says Eurozone Has Tools to Deal with Greece Crisis' *Financial Times* (18 April 2015) <http://www.ft.com/cms/s/0/517ba66c-e5ef-11e4-ab4e-00144feab7de.html#axzz3wZpWg6F0> accessed 7 January 2016.

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