

THE VULNERABILITIES OF DEBT IN THE SHADOW BANKING SECTOR

TABLE OF CONTENTS

1. INTRODUCTION	1
2. DEFINING SHADOW BANKING	2
2.1 The Origins of Shadow Banking	2
2.2 The Makings of Shadow Banking	3
2.3 Appropriateness of the Term	4
2.4 The Definition Problem	6
3. DEBT	8
3.1 What is debt?	8
3.1.1 Traditional banking sector	9
3.1.2 Shadow banking sector	10
4. INFORMATION SENSITIVITIES OF DEBT	14
4.1 Information insensitive debt and safe assets	14
4.2 Information sensitive debt	15
4.3 Supply and demand for safe assets	16
5. LIQUIDITY	18
5.1 Market liquidity and funding liquidity	19
5.1.1 Funding liquidity	19
5.1.2 Market Liquidity	20
5.2 The Interaction between market liquidity and funding liquidity	22
6. THE VULNERABILITIES OF DEBT	22
6.1 The two faces of a debt contract	22
6.2 The leverage and liquidity spiral	24
7. RECOMMENDATIONS AND CONCLUSION	28

1. INTRODUCTION

An essential pillar of the shadow banking sector (“SBS”) is the creation of ‘safe’ debt - transforming long term risky assets (for example bonds) into short term, safe ones (for example cash). Traditionally, only credit institutions could create safe debt by way of demand deposits but demand has now grown. The SBS has therefore managed to successfully replicate the functions of the traditional banking sector (“TBS”) by creating a variant of demandable debt,

which is short-term, not subject to deposit insurance and credibly backed by a direct claim on liquidity¹.

However, the SBS cannot produce ‘riskless’ debt. Because debt in the SBS is not riskless, it is vulnerable to not being rolled-over when market participants begin to suspect problems with the underpinning assets used for financial collateral (“FC”) and margining purposes. This makes SBS produced debt ‘runnable’. In the SBS, a run is systemic event and generally a precursor to crises. When runs happen, asset prices crash, margin levels increase and fire sales ensue resulting in a cumulative downward spiral. The situation becomes particularly precarious when highly leveraged financial institutions are forced to de-leverage precisely at a time when market volatility is high and asset prices are low.

2. DEFINING SHADOW BANKING

2.1 The Origins of Shadow Banking

In 2007, at the annual economic policy symposium of the Kansas City Federal Reserve in Jackson Hole, Wyoming, American economist Paul McCulley coined the term ‘shadow banking’ to describe a system that posed significant risk to financial stability because it was untouched by regulation, has lain hidden for years and operates on a subterranean level². Despite ‘shadow banking’ being a relatively new term however, the concept is not; the origins arguably tracing back to 19th century England when Walter Bagehot wrote *Lombard Street: A Description of the Money Market*³.

Bagehot observed that London banks operated in parallel with financial firms known as ‘bill brokers’, who performed much the same functions as banks, but were not banks. Indeed, Bagehot noted that bill brokers were “a special sort of banker who allow daily interest on deposits, and who for most of their money give security” as collateral to hedge risk⁴. In modern day terms, Bagehot’s definition of ‘bill brokers’, who performed the activity of converting bills

¹ See generally, J Benjamin, G Morton and M Raffan, “The future of securities financing” (2013) 7 *Law and Financial Markets Review*.

² P A McCulley, “Teton Reflections” (2007) 2 *PIMCO Global Central Bank Focus*.

³ W Bagehot, *Lombard Street: A Description of the Money Market* (1873).

⁴ *Ibid* at 28.

into money, is very similar to what is known today as shadow banking⁵. Yet Walter Bagehot is not the only commentator to recognise the importance of the SBS over the decades. There have been a whole host of other examples⁶, one of which is described by Friedrich Hayek, who, in 1931, observed that:

“There can be no doubt that besides the regular types of circulating medium, such as coin, bank notes and bank deposits, which are generally recognised to be money or currency, and the quantity of which is regulated by some central authority... there also exists other forms of media of exchange... without being subject to any central control”⁷.

2.2 The Makings of Shadow Banking

The SBS comprises a varied set of entities, activities and transactions that function within the legal perimeter, yet outside the confines of prudential bank regulation. Unlike the TBS, the SBS is not a single identifiable system but a constantly evolving network consisting of a varied and largely unrelated set of activities. The crux of the SBS is that it provides an alternative source of funding to that offered by the TBS. It provides funding by decomposing the process of credit intermediation into a sequence of discreet operations, pursued by very different types of financial market actors, who interact across the wholesale funding market and rely on the wholesale market for funding⁸. In doing so, the SBS participates in the activity of credit intermediation by redistributing risk through credit, maturity and liquidity transformation, raising systemic risks, especially if combined with high leverage. It is through credit intermediation that shadow banks provide funding and will be elucidated as follows⁹:

⁵ M Ricks, “Regulating Money Creation after the Crisis” (2011) *Harvard Law School* 75 at 87-88. See also, A M Paces and H Nabilou, “The Law and Economics of Shadow Banking” (2017) *ECGI Working Paper Series in Law* 1 at 5.

⁶ In 1993, the activity of what is known today as shadow banking was referred to as the “parallel banking system”, see generally J W D’Árista and T Schlesinger, “The Parallel Banking System” *Economic Policy Institute Briefing Paper* (1993); P Mehrling, Z Pozsar, J Sweeney and D Neilson, “Bagehot was a Shadow Banker: Shadow Banking, Central Banking, and the Future of Global Finance” (2012) *Institute for New Economic Thinking* 1 at 1-2.

⁷ F A Hayek, *Prices and Production* (1931) 113-114. See also, J Sweeney, “When Collateral is King” (2013) *Credit Suisse* 1 at 2-4, available at: http://www.bankofengland.co.uk/research/Documents/ccbs/Workshop2013/presentation_sweeney.pdf.

⁸ S Ghosh, I Gonzalez del Mazo and I Otker-Robe, “Chasing the Shadows: How Significant is Shadow Banking in Emerging Markets?” (2012) 88 *The World Bank* 1.

⁹ European Banking Authority, “EBA issues final Guidelines on institutions exposures to shadow banking entities and recommends approach to limiting risks” (15th December, 2015), available at: <https://www.eba.europa.eu/-/eba-issues-final-guidelines-on-institutions-exposures-to-shadow-banking-entities-and-recommends-approach-to-limiting-risks>.

1. *Leverage*: As opposed to using equity, leverage involves investing utilising borrowed funds;
2. *Transferring credit risk*: The purpose of transferring risk is to pass it from one party who does not want the risk, to another party who is willing, for a fee, to take on the burden of risk;
3. *Maturity transformation*: Involves borrowing funds for short periods and investing or lending for longer periods of time; and,
4. *Liquidity transformation*: The term ‘liquidity’ represents the ease with which an asset can be turned into cash. Liquidity transformation relates to assets, such as cash, which is used to invest in less liquid assets, such as, bonds or derivatives.

Participants of the SBS include a wide range of bank and non-bank financial intermediaries conducting various activities. Players typically include, but are not limited to, prudentially regulated banks, money market mutual funds (“MMMF”), credit hedge funds, investment banks, large financial institutions, private individuals and special purpose vehicles¹⁰. The transactions through which these entities carry out their activities are generally repos, securities lending and derivatives transactions.

2.3 Appropriateness of the Term

The fact that the SBS now accounts for a significant part of the financial system makes one wonder whether the term ‘shadow banking’ is “pejorative”?¹¹ Indeed, the term automatically implies a sector of dubious legality containing somewhat “clandestine” and “nefarious” connotations¹². Arguably, however, this explanation¹² does capture the activities that played a large part in precipitating and exacerbating the GFC, such as excessive self-interest, corporate

¹⁰ This list is not finite; in fact, virtually any entity operating in the financial system can conduct shadow banking in one way or another.

¹¹ M Singh, “The Economics of Shadow Banking” (2013) *Reserve Bank of Australia Conference Volume 5* at 22 (footnote 29).

¹² J Macey, “It’s All Shadow Banking, Actually” (2011 - 2012) *31 Rev. Banking & Fin. L* 593 at 593. See also, E Lee, “Shadow Banking System in China after the Global Financial Crisis – Why Shadow Banks can Distort the Capital Market Order” (2015) *3 Peking University Law Journal* 361 at 362-363.

greed, poor governance, high leverage and regulatory arbitrage; this is potentially a reason as to why the SBS now has such an ignominious reputation¹³.

Yet the SBS is not all related to systemic risk. There are many elements of the sector that pose little systemic threat. As such, commentators have argued that it may be beneficial to disaggregate the various elements that fall under the ambit of the SBS by assessing the risks and benefits they present¹⁴. It is arguably incorrect and technically imprecise to categorise the safe and beneficial aspects under the negative term ‘shadow banking’. In an attempt to facilitate this disaggregation, more synonymous and neutral phrases, such as, “parallel banking”¹⁵, the “market based credit system”¹⁶ and “near-bank entities”¹⁷ have all been coined in an attempt to replace the original term. An interesting comparison can be drawn with India, who uses the term: “Non-Banking Financial Company”, which has been within the regulatory architecture of the Reserve Bank of India since 1963¹⁸.

Nevertheless, despite the valiant efforts, the term ‘shadow banking’ continues to be used in most jurisdictions and by many commentators, potentially to highlight that a problem exists and the urgent need to address it¹⁹. The term ‘shadow banking’ is, therefore, both an unfortunate use of words and a stroke of genius²⁰. Unfortunate, because the term is wrongly ascribed to many safe and beneficial elements of the financial system. Genius, because the very phrase

¹³ E McBride and S Pignal, “Shadow and Substance” (10th May, 2014) *The Economist*, available at: http://www.economist.com/sites/default/files/20140510_international_banking.pdf.

¹⁴ D K Tarullo, “Thinking Critically about Nonbank Financial Intermediation” (17th November, 2015) *Speech given at the Brookings Institution in Washington D.C.*, available at: <https://www.federalreserve.gov/newsevents/speech/tarullo20151117a.htm>.

¹⁵ T Geithner, “Reducing Systemic Risk in a Dynamic Financial System” (9th June, 2008) *Federal Reserve Bank of New York*. See also, J W D’Árista and T Schlesinger, “The Parallel Banking System” *Economic Policy Institute Briefing Paper* (1993) 1 at 7.

¹⁶ P Mehrling, *The New Lombard Street: How the Fed Became the Dealer of Last Resort* (2011) 113. See also, P Mehrling, Z Pozsar, J Sweeney and D H Neilson, “Bagehot was a Shadow Banker: Shadow Banking, Central Banking, and the Future of Global Finance” (2013) 1 at 2-4.

¹⁷ R H Huang, “Shadow Banking and its Regulation: The Case of China”, in R Buckley, E Avgouleas and D Arner (eds) *Reconceptualising Global Finance and its Regulation* (2016) Chapter 17 generally.

¹⁸ Non-banking finance companies are said to include: Insurance companies, pension funds and public financial institutions. See, R Gandhi, “Danger Posed by Shadow Banking Systems to the Global Financial System – The Indian Case” (21st August, 2014) *International Conference on Governance & Development: Views from G20 Countries* 1 at 4-5, available at: <http://www.bis.org/review/r140827b.pdf>.

¹⁹ R H Huang, “Shadow Banking and its Regulation: The Case of China”, in R Buckley, E Avgouleas and D Arner (eds) *Reconceptualising Global Finance and its Regulation* (2016) 340.

²⁰ A Nesvetailova, “The Evolution of Nowhere Banking” (2014) *Risk & Regulation* 6 at 6-7.

‘shadow banking’ invokes something hidden, furtive even; a sort of film noir backdrop in contrast to the well-lit setting of the insured depository banking institution.

2.4 The Definition Problem

How, then, to define shadow banking? The term ‘shadow banking’ is often used as a catch-all term to refer to a number of divergent institutions, instruments, markets and activities. Its amorphous nature has arguably become an obstacle to providing a clear and commonly agreed definition. The most commonly used definition is that of the Financial Stability Board, who define shadow banking as: ‘credit intermediation involving entities and activities outside the regular banking system’²¹.

The authors argue that trying to define shadow banking in such a broad and all-encompassing way is arguably a fruitless endeavour. Firstly, the scope of this definition is too wide; the purpose appears to be more for surveillance and monitoring, rather than to provide an adequate workable definition. Secondly, this definition is not the most enlightening, and raises more questions than it answers; questions, such as, who are the entities, and what are the activities that comprise the SBS?²² Thirdly, financial innovation and regulatory change across multiple jurisdictions ensures that the nature of the SBS is fluid and constantly evolving. It is therefore submitted that trying to define shadow banking using this broad approach will always be a challenge; identifying and summarising a complete set of characteristics that can apply to past, present and future shadow banking entities and activities may prove to be too difficult a task.

Instead, an alternative approach to define ‘shadow banking’ could (and should) be adopted. A better approach may be to construct a definition in relation to the purpose for which shadow banking is used. For example, the purpose of this article will be to explore shadow banking as

²¹ Financial Stability Board, ‘Shadow Banking: Strengthening Oversight and Regulation’ (27 October 2011) 1 <http://www.fsb.org/wp-content/uploads/r_111027a.pdf> accessed 28 December 2018. There are other examples too, such as: The Bank of England, who defines shadow banking as: Instruments, structures, firms, or markets which, alone or in combination, replicate, to a greater or lesser degree, the core features of commercial banks: monetary or liquidity services, maturity mismatch, and leverage – see P Tucker, “Shadow Banking, Financing Markets and Financial Stability” (21st January, 2010) *Bank of England News Release*. The European Central Bank defines shadow banking as: Activities related to credit intermediation, liquidity, and maturity transformation taking place outside the regulated banking system – see K Bakk-Simon, S Borgioli, C Giron, H Hempell, A Maddaloni, F Recine and S Rosati, “Shadow Banking in the Euro Area: An Overview” (April, 2012) *133 ECB Occasional Paper Series* 1 at 5. This list is not exhaustive.

²² V Lemma, *The Shadow Banking System: Creating Transparency in the Financial Markets* (2016) 18. See also, E Lee, “The Shadow Banking System – Why it Will Hamper the Effectiveness of Basel III” (2015) *008 University of Hong Kong Faculty of Law Research Paper* 1 at 13.

a market based finance system that has its roots in the money markets. The money market is a market where transactions such as repos, securities lending and derivatives contracts facilitate collateralised finance; it is a market where long-term capital market assets are funded with short-term money market liabilities. ‘Shadow banking’ is, therefore, a ‘market based finance system’ that provides an attractive funding alternative to that offered by the TBS²³.

The aforementioned description can be described as ‘functional’. A functional approach is able to unpack the economic purposes of the transactions used within the SBS. Such an approach is beneficial because it is intended to capture the complex practices through which money is created within the modern financial system²⁴. Exploring the SBS in this way, that is, through the lens of the transactions with which the SBS functions, requires a “money view”²⁵. The money view captures a distinctive element of the SBS: it is a market based finance system where debt relationships are organised via tradable securities²⁶.

It is precisely the presence of collateral that gives the SBS its distinctive character. Collateral comes in the form of marketable financial assets and depending upon the liquidity of the collateral, implies the promise of cash immediacy without making much of a loss. Collateral can, therefore, be described as a mechanism that is designed to hedge default risk. It is a safety net that implies that, should the borrower default, the collateral can be liquidated to make good on the promise. Collateral is the underpinning feature that makes such promises credible. As such, collateral is widely recognised as having “money”²⁷, “cash”²⁸ and “quasi-money”²⁹ like equivalence. However, the implied liquidity of collateral, and the fact that it can be considered

²³ Other commentators have defined shadow banking in a similar way. For example, Alessio Paces and Hossein Nabilou define shadow banking as: Leveraging on collateral to support liquidity promises – see A M Paces and H Nabilou, “The Law and Economics of Shadow Banking” (2017) *ECGI Working Paper Series in Law* 1 at 11. Another similar definition is provided by Daniela Gabor and Jakob Vestergaard, who state that shadow banking is defined as: Repo liabilities supported by tradable collateral – see D Gabor and J Vestergaard, “Towards a theory of shadow money” (2016) *Institute for New Economic Thinking Working Paper* 1 at 1.

²⁴ D Gabor and J Vestergaard, “Towards a theory of shadow money” (2016) *Institute for New Economic Thinking Working Paper*.

²⁵ P Mehrling, “Essential hybridity: A money view of FX” (2013) 41 (2) *Journal of Comparative Economics*.

²⁶ D Gabor and J Vestergaard, “Towards a theory of shadow money” (2016) *Institute for New Economic Thinking Working Paper*.

²⁷ G Yeowart, R Parsons, E Murray and H Patrick, *Yeowart and Parsons on the Law of Financial Collateral* (2016) 155.

²⁸ M Singh, *Collateral Reuse and Balance Sheet Space* (2017) 5.

²⁹ E Perotti, “The roots of shadow banking” (December, 2013) 69 *Policy Insight Centre for Economic Policy Research* 1.

to be as safe as money, makes the contracts backed by the collateral, such as, repos, securities lending and derivatives, subject to run³⁰; which was a fundamental issue during the GFC.

3. DEBT

The output of banks is money and it is a truism of finance that banks, whether shadow or traditional, are in the money creation business by producing safe and liquid short-term debt. The creation of debt is, indeed, an essential function of banking and such debt is special in the sense that it is immune to adverse selection (asymmetric/secret information) by privately informed market participants. In particular, this kind of debt is special due to its liquid and stable nature and can be traded at (negligible) par without fear that secret information will alter its value. Banks create debt in order for people and firms to transact – it is the “technology for conducting trade”, which is a necessity for an economy to function efficiently³¹. There is an obvious demand for debt by households and firms, and banks/shadow banks are the entities who supply the debt – it is an essential feature of market economies.

3.1 What is debt?

In its simplest form, debt is a financial contract under which the borrower promises to repay a certain amount at an agreed future date to the lender. The leading and most tangible illustration of debt in the SBS is collateralised finance transactions (CFTs) where the collateral taker (“CT”) sells/lends money or assets and in return the collateral giver (“CG”) promises to repay upon maturity of the contract. In other words, a CFT is merely an IOU – a private contract pursuant to which one party agrees to deliver cash or assets to another party in the future. Historically, only the TBS created debt through demand deposits, but demand has now grown and the SBS has, in fact, successfully replicated the functions of debt originally found in the TBS³². Before going on to discuss the role debt plays in the SBS, it is worthwhile to briefly explore the role of debt as it operates in the TBS. This will prove useful in not only understanding debt but crucially how the SBS has mimicked the TBS’ unique ability to credibly promise liquidity on demand.

³⁰ A M Paces and H Nabilou, “The Law and Economics of Shadow Banking” (2017) *ECGI Working Paper Series in Law* 1 at 5.

³¹ G B Gorton, *Misunderstanding Financial Crises: Why We Don’t See Them Coming* (2012) 45-46.

³² P Mehrling, *The New Lombard Street: How the Fed Became the Dealer of Last Resort* (2011) 72-77.

3.1.1 Traditional banking sector

Within the TBS, the vast majority of demand deposits do not sit idle in a vault. Instead, they are redeployed into loans and other forms of credit “to keep the wheels of industry and agriculture turning”³³. Consequently, the actual cash reserves held by a bank typically amount to a small proportion of their outstanding deposits – hence the title: ‘fractional reserve banking system’. Banks, then, actually augment the money supply by creating deposits that are not backed by cash and economists often use the term ‘money multiplier’ to refer to this phenomenon - the ratio of bank depository obligations in relation to cash reserves. Banks in the EU multiply each Euro they hold into many more Euros through deposit taking and loan making. To say that banks create money is another way of saying that demand deposits function as money and thus serve as a common substitute for legal tender³⁴.

Banks attract demandable debt by giving depositors a short-term, safe and insured option to house their capital, whilst promising at par liquidity on demand³⁵. Depositors willingly take advantage of banks’ unique ability to credibly promise at par liquidity on demand because funds are insured up to €100,000 through the European Deposit Guarantee Scheme (“EDGS”)³⁶. From the perspective of the depositor, its funds are completely safe (even if there is a bank run³⁷). With the advent of the EDGS, banks operating in the TBS are, according to Gary Gorton, able to produce ‘riskless’ debt³⁸. Although the author remains skeptical about the term ‘riskless’.

³³ Speech by President Franklyn Roosevelt, “The Banking Crisis” (12 March, 1933). See also, G B Gorton, *Misunderstanding Financial Crises: Why We Don’t See Them Coming* (2012) 115.

³⁴ M Ricks, “Regulating Money Creation After the Crisis” (2011) *1 Harvard Business Law Review* 75 at 76.

³⁵ C W Calomiris and C M Kahn, “The Role of Demandable Debt in Structuring Optimal Banking Arrangements” (1991) *The American Economic Review* 497 at 497. See also, G B Gorton, *Misunderstanding Financial Crises: Why We Don’t See Them Coming* (2012) 45.

³⁶ Despite the deposits not being fully backed by equal amounts of currency in the banks’ vault. See also, Recitals 21 and 23 and Article 6 (1) and (2), Directive 2014/49/EU of the European Parliament and the Council of 16 April 2014 on Deposit Guarantee Schemes (“DGSD 2014/49”). Under the newly formed European Banking Union, the third pillar, titled the European Deposit Insurance Scheme (“EDIS”), is not yet operational. However, EDIS will take over from the current EDGS. On this, see Commissioner Lord Hill at the Press Conference on the EDIS Proposal at the European Parliament on 24th November, 2015 in Strasbourg, available at: http://europa.eu/rapid/press-release_SPEECH-15-6154_en.htm. See also, E Perotti, “The roots of shadow banking” (2013) 69 *CEPR Policy Insight* 1 at 1.

³⁷ Similar to that experienced by Banco Popular in 2017. On this see, M Arnold, “Banco Popular faced eurozone’s first large-scale bank run, ECB says” (8 June, 2017) *Financial Times*, available at: <https://www.ft.com/content/467b56e8-1bff-3034-83a4-c91bb5f8ed24>. See also, Single Resolution Board, “Banco Popular” (7 June, 2018) available at: <https://srb.europa.eu/en/content/banco-popular>.

³⁸ The primary purpose of deposit insurance is to ensure that successful commerce can be maintained because there is a credible monetary system and such credibility requires that bank deposits be made secure. In other words, the primary purpose of deposit insurance is to ensure that deposits are traded at par. See also, G Gorton, “Slapped in the Face by the Invisible Hand: Banking and the Panic of 2007” (2009) *Federal Reserve Bank of Atlanta* 1 at 4, 7, 9 and 43; see also generally, G B Gorton, *Misunderstanding Financial Crises: Why We Don’t See Them Coming* (2012).

This term implies that there is no risk and given that finance is inherently unpredictable, if the broader institutions underpinning the EDGS fail, intuitively, the consequences could be cataclysmic.

Figure 1 below depicts the TBS and illustrates the standard way that banks issue debt, which subsequently becomes a ‘money multiplier’ through deposit taking and loan making.

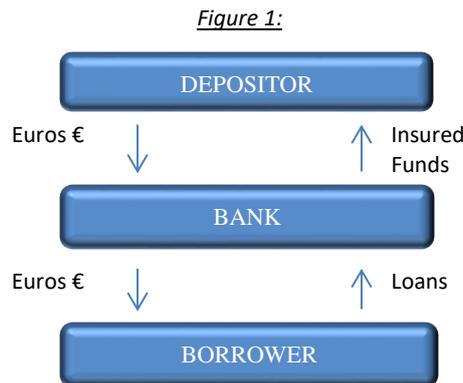


Figure 1 illustrates that there is a depositor who deposits money with a bank. The bank uses this money by loaning out funds to a borrower who, for instance, requires money for a mortgage. In return, the asset the bank will receive, which will be collected upon over time, is the loan itself. The bank, therefore, receives a recurring income stream for the lifecycle of the loan. The depositor receives a deposit account which ensures that the deposited funds are insured and redeemable at par upon demand³⁹. Therefore, the borrower has a long term debt to the bank and the bank has a short term debt to the depositor. This is the standard way banks create money in the TBS⁴⁰.

3.1.2 Shadow banking sector

Demand deposits are of no practical use to institutions and private individuals operating in the SBS⁴¹. The fact that these entities often ‘deposit’ large amounts of money for short periods of time ensures that the EDGS threshold would be exceeded and anything above €100,000 is

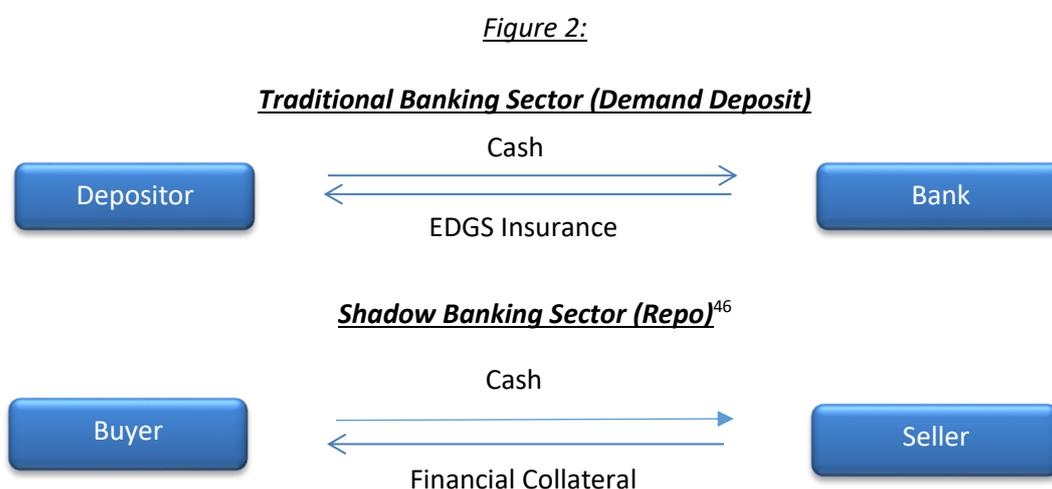
³⁹ R Buckley, “The Changing Nature of Banking and Why it Matters”, in R Buckley, E Avgouleas and D Arner (eds), *Reconceptualising Global Finance and its Regulation* (2016) 9 at 9-20.

⁴⁰ M Ricks, “Regulating Money Creation After the Crisis” (2011) *1 Harvard Business Law Review* 75 at 76-78.

⁴¹ A Krishnamurthy, “How Debt Markets Malfunctioned in the Crisis” (2010) *24 (1) Journal of Economic Perspectives* 3 at 9-10.

uninsured (and subject to bail-inable claims⁴²). Meaning that an entity depositing more than €100,000 in the TBS could face a capital loss should the bank face difficulties⁴³.

Most market participants understandably prefer risk free liquid claims. As such, the SBS has created an alternative of demandable debt not subject to prudential regulation and credibly backed by a direct claim on liquidity⁴⁴. Within the SBS, when market participants want a safe place to house their capital, raise funds or borrow securities, they generally do so through the use of CFTs. The SBS' distinctive liquidity guarantee arises from their issuing of collateralised financial credit in repo, securities lending and derivatives transactions⁴⁵. As illustrated by *Figure 2* below, the SBS is functionally equivalent to the TBS because debt contracts in the SBS are backed by FC just as debt contracts in the TBS are backed by the EDGS.



In both transactions outlined above in *Figure 2*, debt is designed to be safe. In a repo transaction, for example, generally the maturity of a repo is overnight with the debt contract rolled over (renewed) on a daily basis⁴⁷. This infers a confidence in immediacy due to its short maturity as

⁴² The EDGS only insure deposits of up to €100,000 in the EU. Therefore, anything above this amount that is deposited within a credit institution becomes ‘unsecured’ and a ‘bail-inable’ claim should the bank fall into trouble. On this see Article 44 (2) (a) of the Bank Recovery and Resolution Directive 2014/59/EU (“BRRD”). A recent example of unsecured deposits being written down to zero was on 5 October, 2015 where the Danish Bank ‘Andelskassen JAK Slagelse’ applied the BRRD – on this see the European Parliament, “Bail-ins in recent banking resolution and State aid cases” (7 July, 2016) available at: http://www.europarl.europa.eu/RegData/etudes/IDAN/2016/574395/IPOL_IDA%282016%29574395_EN.pdf.

⁴³ D Gabor and J Vestergaard, “Towards a theory of shadow money” (2016) *Institute for New Economic Thinking Working Paper 1* at 10.

⁴⁴ E Perotti, “The roots of shadow banking” (2013) 69 *CEPR Policy Insight 1* at 1.

⁴⁵ See generally, J Benjamin, G Morton and M Raffan, “The future of securities financing” (2013) 7 *Law and Financial Markets Review*.

⁴⁶ A repo example has been used here but it could equally apply to securities lending and derivatives transactions.

⁴⁷ A repo transaction is used here as an example but it could also be a cash driven securities lending transaction or a derivatives currency swap transaction, to name a few.

it is routinely rolled over⁴⁸. In addition, Aaa government bonds are often used as FC to secure the repo and the safety of the debt contract is dependent upon the quality of the FC (and the applicable level of margin). Aaa government bonds are deemed the highest quality, most liquid and therefore safest form of FC as they are underpinned by a credible government. As such, it is generally unnecessary for market participants to do any due diligence on, or to determine the provenance of, the government bond because its value is known and accepted by all.

3.1.2.1 The creation of shadow money

“Everyone can create money, the problem is to get it accepted”⁴⁹.

The use of FC and leverage are central to the creation of shadow money. For instance, it is common practice for a CG, such as a hedge fund, to spend €100,000 of its own equity to buy an asset worth 10 times as much (€1million)⁵⁰. CFTs facilitate these sorts of transactions through the reuse of FC, which enables financial institutions to borrow securities or cash “to make leveraged bets on an already leveraged instrument”⁵¹. To build such positions, the Bank for International Settlements has noted that in repos, for example⁵², “market participants use cash raised through an initial repo transaction to buy securities which, in turn, are repoed out to raise more cash to buy more securities and so on... [*ad infinitum*]”⁵³. With each transaction the leverage ratio increases because the re-use/re-hypothecation of FC is a “money multiplier” allowing market participants to recursively leverage their positions implying that there could,

⁴⁸ The opposite is also the case where the buyer in the repo can demand his cash back by not rolling over the repo. See E Perotti, “The roots of shadow banking” (2013) 69 *CEPR Policy Insight* 1 at 1.

⁴⁹ H Minsky, *Stabilizing an unstable economy* (1986) 228.

⁵⁰ This means that the hypothetical transaction has a 10% margin: €1million/€100,000 = 10 (or a leverage ratio of 10:1) and will be discussed further below.

⁵¹ J Cullen, “The repo market, collateral and systemic risk: in search of regulatory coherence”, in I H Y Chiu and I G MacNeil, *Research Handbook on Shadow Banking Legal and Regulatory Aspects* (2018) 85 at 93-94.

⁵² Or any other CFT for that matter.

⁵³ Bank for International Settlements, “Repo Market Functioning” (2017) *CFGS Paper No. 59* 1 at 6. See also, J Cullen, “The repo market, collateral and systemic risk: in search of regulatory coherence”, in I H Y Chiu and I G MacNeil, *Research Handbook on Shadow Banking Legal and Regulatory Aspects* (2018) 85 at 93-94; European Systemic Risk Board, “ESRB opinion to ESMA on securities financing transactions and leverage under Article 29 of the SFTR” (October, 2016) 1 at 5; P C Harding and C A Johnson, *A Practical Guide to Using Repo Master Agreements* (2017) 14.

theoretically, be infinite amounts of leverage⁵⁴. This is the standard way that money is created in the SBS⁵⁵.

3.1.2.3 The role of margin

Margin is applied to the transaction to add a further layer of safety⁵⁶. There are two reasons for this. Firstly, trading in a debt contract that is sufficiently overcollateralised (i.e. an appropriate level of margin) is a cheap and effective way to avoid adverse selection – that is, neither party to the transaction has superior private information over the other. For instance, when all parties to the CFT know that there is enough FC, more precise information about the FC becomes irrelevant and does not impair liquidity in the market. The key idea is that the CT is confident that should default occur, the FC can be liquidated to make good on the initial promise⁵⁷. The margin (overcollateralisation) component is crucial because it acts as a time horizon financial buffer thus taming any uncertainty.

Secondly, margin limits leverage. While the section above argues that levels of leverage can theoretically be infinite, it is important to note that while leverage is a multiplier of gains, the flipside is it is also a multiplier of losses. Margin is therefore applied to the transaction to reduce leverage levels. The way it works is as follows: A hedge fund who buys an asset worth €1million with 10% margin means that the hedge fund must fund the transaction with €100,000 of its own equity⁵⁸. The hedge fund is then able to buy an asset worth €1million for €100,000⁵⁹. The fact that this debt contract is generally backed by safe FC and the transaction is sufficiently overcollateralised, gives the CT a sufficient level of safety. The margin level determines this safety in that the higher the margin, the more that has to be funded by the CG's own equity and vice versa. In practice, it is up to the parties to decide on the appropriate level of margin but as

⁵⁴ J Cullen, "The repo market, collateral and systemic risk: in search of regulatory coherence", in I H Y Chiu and I G MacNeil, *Research Handbook on Shadow Banking Legal and Regulatory Aspects* (2018) 85 at 94-95. See also, P Mehrling, Z Pozsar, J Sweeney and D H Neilson, "Bagehot was a Shadow Banker: Shadow Banking, Central Banking, and the Future of Global Finance" (2013).

⁵⁵ See generally, D Gabor and J Vestergaard, "Towards a theory of shadow money" (2016) *Institute for New Economic Thinking Working Paper*.

⁵⁶ G Gorton, "Slapped in the Face by the Invisible Hand: Banking and the Panic of 2007" (2009) *Federal Reserve Bank of Atlanta* 1 at 30.

⁵⁷ B Holmstrom, "Understanding the role of debt in the financial system" (2015) *479 BIS Working Papers* 1 at 5. This was also point raised in A Krishnamurthy, "How Debt Markets Malfunctioned in the Crisis" (2010) *24 (1) Journal of Economic Perspectives* 3 at 8 where it is stated that lenders will typically set the margin high enough to avoid any detailed analysis.

⁵⁸ G Gorton, T Laarits and A Metrick, "The Run on Repo and the Fed's Response" (2018) 1 at 2-3.

⁵⁹ J Geanakoplos, "Solving the Present Crisis and Managing the Leverage Cycle" (2010) *FRBNY Economic Policy Review* 101 at 102-103.

a general rule, the higher the quality of the FC (such as Aaa government bonds) the lower the margin and the lower the quality of the FC (such as shares) the higher the margin. The fact that the margin is first to be absorbed in a stressed situation, gives the CT time to liquidate the FC to recoup the principal. It should however be noted that while margin is principally in place to mitigate risk, as illustrated below, it is a mechanism that also amplifies risk.

4. INFORMATION SENSITIVITIES OF DEBT

“Debt exists because it minimizes secrets. Bank debt is designed to be secret-proof, and thus liquid; that is, debt that can be traded easily, at... [negligible] par, without worrying about a loss to a counterparty that has private information. But a small shock to the economy can cause market participants to think that others know secrets, as they lose confidence in the debt’s invulnerability to secrets. This creates a crisis when much of the banking system is leveraged with debt that is thought to be liquid but turns out not to be”⁶⁰.

4.1 Information insensitive debt and safe assets

“Debt is designed to be... information insensitive”⁶¹

In order for the SBS to produce safe and liquid debt, the assets used for FC and margining purposes to secure the transaction must be ‘information insensitive’. The term ‘information insensitive’ in this context, refers to an asset, such as cash or Aaa government bonds, that is safe and maintains a stable value in the face of new information and/or bad news⁶². When all parties to the transaction know that there are no secrets to be known, markets can be said to be liquid. The situation where there is nothing to know or nothing worth knowing – no secrets – is desirable and allows for efficient transactions. Thousands of CFTs take place every day. The reason this number is so high is because parties do not do any due diligence on the assets and are not required to because the assets are above suspicion – they are safe - and thus ‘information insensitive’⁶³.

⁶⁰ G B Gorton, *Misunderstanding Financial Crises: Why We Don’t See Them Coming* (2012) 58.

⁶¹ G B Gorton, *Misunderstanding Financial Crises: Why We Don’t See Them Coming* (2012) 137.

⁶² B Holmstrom, “Understanding the role of debt in the financial system” (2015) *479 BIS Working Papers* 1 at 9.

⁶³ C Garcia, “Misunderstanding Financial Crises, A Q&A with Gary Gorton” (25 October, 2012) *Financial Times Alphaville*.

The term ‘information insensitive’ is not the same as ‘risk free’, however. Think of a government bond of a stable country. If the country issuing the debt defaults (Greece 2012)⁶⁴, the country previously considered ‘safe’, suddenly is not. This is a rare occurrence and according to Gary Gorton, Europe has a very saleable product, namely “safe debt”⁶⁵. Yet, when an asset moves from being information *insensitive* (safe) to one where market participants begin to question the safety of the asset - it becomes information *sensitive* (unsafe)⁶⁶. The transition from information *insensitivity* to information *sensitivity* can be damaging because as speculators learn of secret information, they will take advantage of the less informed in a trade⁶⁷. This is why debt contracts in the SBS are ‘runnable’ - *en-masse* demands by holders of debt for cash⁶⁸.

4.2 Information sensitive debt

“Debt is contaminated by the secrets problem”⁶⁹.

While much of the discussion thus far has focused on Aaa government bonds and cash as a source of FC, it should be noted that there is not an infinite supply of safe assets. Often, other forms of riskier FC are relied upon to secure a transaction. These include lower graded debt (corporate bonds) and equity (shares). For example, equity in the form of a company share, used for FC and margining purposes, is highly volatile; it is subject to frequent and unpredictable intraday market price fluctuations, precisely because such an asset is *sensitive* to information. The fact that every piece of information is relevant for the price of a share⁷⁰, the

⁶⁴ Or Ukraine in 2016 or Venezuela in 2017.

⁶⁵ C Garcia, “Misunderstanding Financial Crises, A Q&A with Gary Gorton” (25 October, 2012) *Financial Times Alphaville*.

⁶⁶ Information sensitive assets will be discussed in greater detail below.

⁶⁷ B Holmstrom, “Understanding the role of debt in the financial system” (2015) *479 BIS Working Papers* 1 at 15. See also, G Gorton, “Slapped in the Face by the Invisible Hand: Banking and the Panic of 2007” (2009) *Federal Reserve Bank of Atlanta* 1 at 3-4 and 7.

⁶⁸ Runnable debt has been described by several commentators as important precursors to crises. In its simplest form, runnable debt is produced by the TBS, in the form of demand deposits. As to how SBS created runnable debt, which leads to crises will be discussed in greater detail below. See also, G B Gorton, *Misunderstanding Financial Crises: Why We Don’t See Them Coming* (2012) 9.

⁶⁹ G B Gorton, *Misunderstanding Financial Crises: Why We Don’t See Them Coming* (2012) 51.

⁷⁰ A continuous flow of information is brought into the stock market, maintaining the relevance and accuracy of prices. The Efficient Markets Hypothesis (“EMH”) posits that information will be reflected rapidly in share prices.

importance of price discovery in stock markets is synonymous with the traders' incentive to acquire information - there is therefore a big incentive to learn secrets, legally or otherwise⁷¹.

While equity is an important source of FC, fluctuations can and do cause problems. If the FC plummets in value, it will subsequently lead to the obligation to post additional FC, and higher margin requirements. This position becomes precarious when highly leveraged financial institutions are forced to deleverage in order to fulfil contractual obligations. The domino effect of this liquidity and leverage spiral directly translates into liquidity drying up as market participants become overly cautious. This situation creates panics and runs, which in turn paves the way for fire sales, downward spirals and future crises⁷².

4.3 Supply and demand for safe assets

The GFC has been a key benchmark for numerous trends within the financial markets and has profoundly affected the supply of, and demand for, safe assets. Commentators have suggested that post GFC reforms have been a key driver in not only limiting the supply of safe assets, but paradoxically creating a demand for these types of assets. Jay Cullen refers to it as a “paradox”, because despite there being demand for safe assets, there is equally a compounding of such assets through regulatory reforms⁷³. Such a paradox has essentially created a scarcity problem⁷⁴. This view has been echoed at EU level, where the European Commission has stated that “the fluidity of collateral throughout the EU is currently restricted, preventing markets from operating efficiently. Since the financial crisis, the demand for collateral has increased, driven by market demand for more secured funding as well as new regulatory requirements, such as”⁷⁵ the Basel III reforms⁷⁶, the CRR⁷⁷ and the European Market Infrastructure Regulation (“EMIR”)⁷⁸.

⁷¹ B Holmstrom, “Understanding the role of debt in the financial system” (2015) *479 BIS Working Papers* 1 at 5-7.

⁷² J Wilmot, J Sweeney, M Klein, A Plant, J Schwartz, Z Shi and W Zhao, “When collateral is king” (15 March, 2012) *Market Focus: Global Strategy Research* 1 at 1-3.

⁷³ J Cullen, “The repo market, collateral and systemic risk: in search of regulatory coherence”, in I H Y Chiu and I G MacNeil, *Research Handbook on Shadow Banking Legal and Regulatory Aspects* (2018) 85 at 87-88.

⁷⁴ Autorité des Marchés Financiers, “The Reuse of Assets: Regulatory and Economic Issues” (9th November, 2016) 1 at 13-14. See also C Garcia, “Misunderstanding Financial Crises, a Q&A with Gary Gorton” (25 October, 2012) *Financial Times Alphaville* where it is argued that demand for safe assets now outstrips supply.

⁷⁵ European Commission Green Paper, “Building a Capital Markets Union” (2015) 1 at 23.

⁷⁶ See generally, Basel Committee on banking Supervision, “High-level summary of Basel III reforms” (December, 2017) available at: https://www.bis.org/bcbs/publ/d424_hlsummary.pdf.

⁷⁷ The CRR is the “Capital Requirements Regulation”.

⁷⁸ Regulation (EU) 648/2012 European Market Infrastructure Regulation (“EMIR”).

Post GFC reforms that affect the supply of, and demand for safe assets originate with the decline of the unsecured money market. In particular, the GFC highlighted that the money markets have led to an increased demand for safe assets. After the default of Lehman Brothers (“LB”) in September 2008, the demand for safe assets increased as market participants were required by the market to provide higher quality and liquid assets to secure their CFT within the money markets⁷⁹.

Moreover, most CFTs are now secured rather than unsecured and, in over-the-counter derivatives (“OTC”) markets, EMIR has introduced mandatory central counterparty clearing for many OTC derivative transactions⁸⁰. However, not all OTC derivative transactions are subject to mandatory central clearing and, in such cases, there is a market demand for participants in the financial sector to post high quality liquid assets to mitigate risk⁸¹.

In addition, the Liquidity Coverage Ratio (“LCR”) and Net Stable Funding Ratio (“NSFR”) under the Basel III framework have also given impetus to the scarcity problem. Under the LCR and NSFR rules, credit institutions are now required to hold a certain percentage of high quality liquid securities in reserve as a safety mechanism should problems occur. The securities held in reserve are essentially locked away and thus prevented from being utilised within the broader financial system. As noted by Levels and Capel:

“There is now a demand for large quantities of liquid assets – principally government bonds... to be locked away. It’s not clear there are enough bonds to go round, and nobody knows how the system will function when it’s less well lubricated”⁸².

It has been suggested by numerous commentators that these assets could otherwise be used for FC and margining purposes thereby providing an important source of liquidity to the marketplace. Having such assets locked away would, intuitively, provide a further layer of

⁷⁹ Autorité des Marchés Financiers, “The Reuse of Assets: Regulatory and Economic Issues” (9th November, 2016) 1 at 13. See also, A levels and J Capel, “Is collateral becoming scarce? Evidence for the euro area” (2012) 1 (1) *Journal of Financial Market Infrastructures* 29 at 30.

⁸⁰ Article 4 of the EMIR.

⁸¹ Articles 11 (15) (a) and 46 (3) (a) of the EMIR. See also, Autorité des Marchés Financiers, “The Reuse of Assets: Regulatory and Economic Issues” (9th November, 2016) 1 at 13.

⁸² A levels and J Capel, “Is collateral becoming scarce? Evidence for the euro area” (2012) 1 (1) *Journal of Financial Market Infrastructures* 29 at 30. See also, McKinsey & Company, “Basel” IV: What’s next for banks” (2017) *Global Risk Practice* 1 at 16-18.

stability to the TBS, which is the objective of the LCR and NSFR. However, this stability may lead to inefficiencies and potential liquidity problems within the broader financial system⁸³.

Given that there is a finite supply of safe assets, it has been noted that such assets are now ‘scarce’⁸⁴. Without enough liquid and safe assets circulating the financial system, blockages within the financial plumbing may be significant given that a key lubricant for the efficient functioning of the financial markets are, indeed, safe assets⁸⁵. A way of mitigating the scarcity problem is to give safe assets ‘velocity’ in the sense that the same asset can be re-used several times over. However, ‘velocity’ does not come without problems.

5. LIQUIDITY

“Liquidity is tantamount to shiftability”⁸⁶.

A characteristic of CFTs is the implied liquidity of the FC/margin underpinning the obligation, which ensures the debt contract remains information *insensitive*⁸⁷. According to John Maynard Keynes an asset is liquid if its value is “more certainly realizable at short notice without loss”⁸⁸. If the FC cannot be quickly realised then it loses its “moneyness” and parties to the transaction do not want to trade with it. Understanding the properties of money is, therefore, a useful starting point in determining liquidity. If the FC/margin is to have “money like equivalence” then it must be a medium of exchange to facilitate transactions; it must be a store of value, which assumes that the money holds its value over time; and, unit of account, which ensures that money can be easily translated into prices⁸⁹.

The reciprocal of money is liquidity. Liquidity encompasses both funding liquidity and market liquidity, and is a term used to describe how easy and quickly it is to convert an asset into cash;

⁸³ M Ferrari, C Guagliano and J Mazzacurati, “Collateral scarcity premia in euro area repo markets” (October, 2017) *European Systemic Risk Board No 55 Working Paper Series*. See also, M Singh, “Collateral Reuse and Balance Sheet Space” (2017) IMF Working Paper 1 at 12; A levels and J Capel, “Is collateral becoming scarce? Evidence for the euro area” (2012) *1 (1) Journal of Financial Market Infrastructures* 29 at 30.

⁸⁴ G Gorton, “Slapped in the Face by the Invisible Hand: Banking and the Panic of 2007” (2009) *Federal Reserve Bank of Atlanta* 1 at 14.

⁸⁵ See generally M Singh, *Collateral and financial Plumbing* (2016).

⁸⁶ H G Moulton, “Commercial Banking and Capital Formation” (1918) *Journal of Political Economy* 726.

⁸⁷ G B Gorton, *Misunderstanding Financial Crises: Why We Don’t See Them Coming* (2012) 47.

⁸⁸ J M Keynes, *A Treatise on Money – Volume 2* (1930) 67.

⁸⁹ P Mehrling, *The New Lombard Street: How the Fed Became the Dealer of Last Resort* (2011).

this implies ‘safety’ in relation to the “full protection from credit, market, inflation, currency and idiosyncratic risks... permitting investors to liquidate positions easily” with the promise of immediacy⁹⁰. However in truth, no financial asset meets this criteria and the best that can be hoped for is ‘near riskless’. In order to maintain stability, margin is applied to the transaction to act as a time horizon financial buffer to ensure that if counterparties cannot make good on their liquidity promise, the collateral taker (“CT”) has a sufficient amount of time to liquidate the FC.

5.1 Market liquidity and funding liquidity

With the heightened use of CFTs, collateralised financial credit has become a primary source of funding, which is crucial for maintaining liquid markets. All transactions are, indeed, dependent upon the availability of funding and such funding can only be obtained if markets are liquid⁹¹. Secondary markets are considered liquid if a market participant can quickly execute a significant quantity of assets at a price close to (or as close as possible to) fundamental value. Market liquidity is of great importance as it allows market participants to enter and exit trading positions and rebalance portfolios efficiently. For market participants to be able to provide liquidity in the secondary markets however, they generally need to raise capital (secured with FC) in the primary market – this is often referred to as funding liquidity⁹². When market participants obtain funding and post high quality assets for FC and margining purposes, financiers will understandably be more willing to lend. Thus the quality of asset serving as security plays a pivotal role in the smooth functioning of the markets. Therefore, market liquidity affects, and is dependent upon, funding liquidity - and vice versa⁹³.

5.1.1 Funding liquidity

Funding liquidity describes the ease with which market participants can raise funding. In good times, when funding liquidity is high, markets are “awash with liquidity” due to the “ability to

⁹⁰ P O Gourinchas and O Jeanne, “Global Safe Assets” (2012) 399 *BIS Working Paper* 1 at 4.

⁹¹ A Krishnamurthy, “How Debt Markets Malfunctioned in the Crisis” (2010) 24 (1) *Journal of Economic Perspectives* 3 at 9.

⁹² A M Paccos, “shadow banking”, in A Marciano and GB Ramello (eds.), *Encyclopedia of Law and Economics* (2018) 1 at 3-4. See also, M K Brunnermeier and L H Pedersen, “Market Liquidity and Funding Liquidity” (2008) *The Society for Financial Studies*.

⁹³ K Boudt, E C S Paulus and D W R Rosenthal, “Funding liquidity, market liquidity and TED spread: A two-regime model” (2017) 43 *Journal of Empirical Science* 143 at 143-144. See also, P Mehrling, *The New Lombard Street: How the Fed Became the Dealer of Last Resort* (2011) 110; M K Brunnermeier, “Deciphering the Liquidity and Credit Crunch 2007 - 2008” (2009) 23 (1) *Journal for Economic Perspectives* 77 at 91.

settle obligations with immediacy”⁹⁴. Leveraged market participants raise money through a CFT by securing the transaction with FC, which is reused in subsequent transactions to raise more funds *ad infinitum*.

In order to facilitate liquid and efficient markets, funding liquidity should generally operate at an optimal level, which is done by the ‘rolling-over’ (renewing) of debt contracts. An inability to roll-over debt signals a potential market problem. This will induce the CT to either become unwilling to extend new funding or, alternatively, enter into a new master agreement with updated terms, such as with higher margin requirements⁹⁵. Either way, the CT restricts funding resulting in liquidity ‘drying up’.

Funding liquidity risk manifests itself in three forms and all are inter-related. The first form is margin risk, which involves increasing margin levels to take account of falling FC values. When margin levels increase, it is a systemic indicator. Increasing margins have, indeed, been noted to being precursors to crises⁹⁶. The second form is rollover risk. Funding liquidity is usually high when debt contracts are routinely rolled-over (when the promised debt is due, they are simply rolled over to a future date⁹⁷), thereby ensuring confidence and supporting long term lending⁹⁸. However, when it becomes too costly or indeed impossible to roll-over the debt, problems can (and generally do) occur. Market participants no longer rolling-over their credit lines are essentially pulling funding from the market place – this is the final form of risk, known as redemption risk - “*with no credit, there is no investment, and there is a recession*”⁹⁹.

5.1.2 Market Liquidity

Market liquidity relates to the ability of buyers and sellers of assets to transact speedily and efficiently without causing drastic change in the price of the assets. The essential characteristic of a liquid market is that there will always be ‘ready and willing’ buyers and sellers. From a safety perspective, market liquidity is critical in relation to investors relying on liquidating their

⁹⁴ M Drehmann and K Nikolaou, “Funding Liquidity Risk: definition and measurement” (2009) *1024 ECB Working Paper Series* 1 at 10. See also, M K Brunnermeier and L H Pedersen, “Market Liquidity and Funding Liquidity” (2008) *The Society for Financial Studies*. See also, M K Brunnermeier, “Deciphering the Liquidity and Credit Crunch 2007 - 2008” (2009) 23 (1) *Journal for Economic Perspectives* 77.

⁹⁵ G Gorton, “Slapped in the Face by the Invisible Hand: Banking and the Panic of 2007” (2009) *Federal Reserve Bank of Atlanta* 1 at 1.

⁹⁶ See generally, G Gorton. “Financial Crises” (30 January, 2018) *Annual Review of Financial Economics*.

⁹⁷ P Mehrling, *The New Lombard Street: How the Fed Became the Dealer of Last Resort* (2011) 68.

⁹⁸ E Perotti, “The roots of shadow banking” (2013) 69 *CEPR Policy Insight* 1 at 1.

⁹⁹ G B Gorton, *Misunderstanding Financial Crises: Why We Don't See Them Coming* (2012) 176-177.

position easily and efficiently with no costs or delays. This can only occur if market liquidity is ‘high’ - when the selling of an asset does not require its value to be altered. Yet the opposite can also occur – market liquidity is ‘low’ when the selling of an asset requires its value to be substantially reduced¹⁰⁰. Low market liquidity causes issues such as market freezes (illiquidity), where market participants are uncertain about the safety of the assets circulating the financial system and therefore act cautiously.

There are three important sub forms of market liquidity, all of which play an important role in determining whether or not market liquidity is ‘high’ or ‘low’. The first is the bid/ask spread, which measures how much market participants will lose if they sell one asset unit and immediately buy it back. The bid/ask spread is a *de facto* measure of market liquidity¹⁰¹. The lower the bid/ask spread the higher the market liquidity and, the higher bid/ask spread, the lower the market liquidity¹⁰². For example, cash is the most liquid of assets and its bid/ask spread is very low (i.e. measured in fractions of Euro cents). Shares, on the other hand, are less liquid assets, and therefore have a much higher bid/ask spread due to the asset being more volatile in nature.

The second is market depth, which shows how many units market participants can buy or sell at the current bid or ask price without the price being affected. Markets are deemed as ‘deep’ when there is a sufficient volume of bid/ask orders, which typically prevents larger orders from significantly moving the price. The measurement of market depth provides an indication of market liquidity. For example, the higher the number of bid/ask orders the deeper the market and therefore the more liquid the market because of demand and supply¹⁰³.

The final sub form of market liquidity is market resiliency. Market resiliency indicates the speed by which fallen asset prices bounce back. A resilient market is a stable market signifying that

¹⁰⁰ J M Keynes, *A Treatise of Money – Volume 2* (1930) 67-68.

¹⁰¹ P Feldhutter and T K Poulsen, “What Determines Bid-Ask Spreads in Over-the-Counter Markets?” (2018) *Copenhagen Business School* 1 at 1.

¹⁰² M K Brunnermeier, “Deciphering the Liquidity and Credit Crunch 2007 - 2008” (2009) 23 (1) *Journal for Economic Perspectives* 77 at 92.

¹⁰³ J Muranaga, “Dynamics of market liquidity” (2000) *Bank for International Settlements* 1 at 2-3. See also, M K Brunnermeier, “Deciphering the Liquidity and Credit Crunch 2007 - 2008” (2009) 23 (1) *Journal for Economic Perspectives* 77 at 92.

market liquidity is high. In a market that lacks resiliency, trading will generally incur large price movements, which can last for long periods of time creating market uncertainty¹⁰⁴.

5.2 The Interaction between market liquidity and funding liquidity

High market and funding liquidity is a signal of ‘good times’. However, liquidity has the potential to suddenly ‘evaporate’ and the mechanisms that this operates through are the mutually reinforcing interaction between funding and market liquidity. Through their interaction, the market illiquidity of assets leads to a decrease of funding opportunities. This causes liquidity to dry up and carries the potential for crises. When assets prices crash because market liquidity and funding liquidity shrink simultaneously¹⁰⁵.

6. THE VULNERABILITIES OF DEBT

The problem with the SBS is debt and its vulnerability. Debt relationships in the SBS are organised via marketable securities. What happens when those securities decline in value? When asset prices decline, “risk is pushed into the tail” and market liquidity and funding liquidity deteriorate¹⁰⁶.

6.1 The two faces of a debt contract

“What is the harm in expanding credit? It will be asked. Credit stimulates business and lively business means good times and prosperity. Yes, but credit also means speculation and an ultimate collapse followed by years of depression and hard times. Too much credit is like a dose of morphine, the effect of which is fine while it lasts but it is followed by the inevitable reaction”¹⁰⁷.

Within the SBS, market participants make a business out of managing the daily inflow and outflow of cash on their balance sheets. The daily cash flow, both in and out, is the crucial

¹⁰⁴ N S Alin, J Hua, L Peng and R A Schwartz, “Stock Resiliency and Expected Returns” (2015) *Working Paper Baruch College* 1 at 3-7.

¹⁰⁵ A M Paces, “Shadow Banking”, in A Marciano and G B Ramello (eds.), *Encyclopedia of Law and Economics* (2018) 1 at 3-4 and 6. See also, M K Brunnermeier and L H Pedersen, “Market Liquidity and Funding Liquidity” (2008) *The Society for Financial Studies*.

¹⁰⁶ A M Paces, “shadow banking”, in A Marciano and GB Ramello (eds.), *Encyclopedia of Law and Economics* (2018) 1 at 6. See also, B Holmstrom, “Understanding the role of debt in the financial system” (2015) 479 *BIS Working Papers* 1 at 15.

¹⁰⁷ Earl Dean Howard, “What Currency Reform Means to the Businessman” (15 September, 1906) 726. See also, G B Gorton, *Misunderstanding Financial Crises: Why We Don’t See Them Coming* (2012) 73.

interface that connects with the larger financial system. This interface provides financial institutions with cash that makes it possible to obtain credit coupled with the burden of future debt obligations. Debt and credit are, therefore, two faces of the same coin¹⁰⁸.

The two faces of debt show themselves not only at the level of the individual financial institution, but also at the level of the system as a whole; one financial institution's cash inflow is another's cash outflow. If the allure of credit induces a financial institution to increase spending, the immediate result is income elsewhere in the system. Similarly, if the burden of debt induces a financial institution to decrease spending, the immediate result is reduced income elsewhere, and thus reduced spending¹⁰⁹. The interaction of balance sheets is the source of what monetary economist Ralph Hawtrey described as the "instability of credit"¹¹⁰.

According to the Hawtrey, the 'instability of credit' originates from credit financed spending, which creates income for others, not only directly but also indirectly by pushing asset prices up. The capital gain for holders of these assets tends to stimulate additional spending, in part to buy ahead of rising demand in order to earn additional profit from rising prices in the future. The feedback loop of rising asset prices and credit expansion is the source of the 'instability of credit' emphasised by Hawtrey¹¹¹.

Credit is required in order for production and consumption. New technologies can be implemented and real things are built, resulting in growth and expansion. Yet growth is coupled with instability and the difficulty lies in identifying whether the growth should be allowed to continue or whether the speculative bubble (instability) should be reined in? The reason this question is difficult to answer is because a credit fuelled boom¹¹² typically involves both aspects - "if you don't catch the bubble early, it may be impossible to do anything"¹¹³. This is why regulation, particularly in relation to margin (and the reciprocal leverage), is crucial. The fact that margin limits the amount of credit an institution can obtain and the fact that leverage has

¹⁰⁸ P Mehrling, *The New Lombard Street: How the Fed Became the Dealer of Last Resort* (2011) 11.

¹⁰⁹ P Mehrling, *The New Lombard Street: How the Fed Became the Dealer of Last Resort* (2011) 12.

¹¹⁰ R G Hawtrey, *Currency and Credit* (1923).

¹¹¹ P Mehrling, *The New Lombard Street: How the Fed Became the Dealer of Last Resort* (2011) 15.

¹¹² A credit fuelled boom can be defined as a period when private credit grows abnormally faster than private gross domestic product ("GDP"). On this, see G B Gorton, *Misunderstanding Financial Crises: Why We Don't See Them Coming* (2012) 59.

¹¹³ P Mehrling, *The New Lombard Street: How the Fed Became the Dealer of Last Resort* (2011) 12-13 and 15.

been at the heart of many past financial crises, it is disappointing that margin is a mechanism that is largely overlooked by regulators¹¹⁴.

6.2 The leverage and liquidity spiral

Financial markets are inherently unpredictable. What happens to the financial system when highly leveraged financial institutions run out of liquidity? In other words, what happens “*when prosperity merges into crisis*”?¹¹⁵. In a credit fuelled boom, if firms are obtaining large amounts of credit with ease and make efficient and effective investments, then output goes up. Credit expansion facilitates the funding of new capital investments, and new spending tends to drive up the general level of prices. Higher prices bring improved profitability and hence also improved creditworthiness, which creates incentive for further credit expansion. This is an unsustainable cumulative upward spiral¹¹⁶.

Both market liquidity and funding liquidity are high because assets are easily bought and sold - even if those assets are not thoroughly investigated. In such cases market participants without good FC are still be able to borrow, increasing the output of the economy. Output is going up, and so is fragility. More and more firms are obtaining credit without investigating the quality of the FC backing the transaction. Greater leverage for the economy as a whole allows greater investment - at the price of greater fragility¹¹⁷.

As a general rule, margin requirements tend to be low when conditions in the financial markets are relatively benign – perceived low risks and minimal volatility in asset prices lead to low margin requirements. Low margin requirements allow for the build-up of excessive leverage because market participants have more FC to borrow against. The flipside is that increasing levels of leverage increases the asset owners’ vulnerability, especially against the backdrop that most CFTs are subject to funding and market liquidity risk (as noted above)¹¹⁸.

¹¹⁴ Strong credit growth has been observed before many famous crises, such Argentina in 1980, Sweden, Norway and Finland in 1997 and the most recent GFC. In fact, one of the most useful indicators of the likelihood of a financial crisis is a measure of credit creation. Moreover, Gary Gorton states that in particular, bank debt has been at the root of every one of the 124 systemic crises around the world from 1970 – 2007. On this, see G B Gorton, *Misunderstanding Financial Crises: Why We Don't See Them Coming* (2012) 45.

¹¹⁵ G B Gorton, *Misunderstanding Financial Crises: Why We Don't See Them Coming* (2012) 75.

¹¹⁶ P Mehrling, *The New Lombard Street: How the Fed Became the Dealer of Last Resort* (2011) 7.

¹¹⁷ G B Gorton, *Misunderstanding Financial Crises: Why We Don't See Them Coming* (2012) 179.

¹¹⁸ J Geanakoplos and L H Pedersen, “Monitoring Leverage” in M Brunnermeier and A Krishnamurthy (eds) *Risk Topography: Systemic Risk and Macro Modeling* (2014) 113 at 117.

When the good times of low margins, high leverage and liquidity inevitably start to deteriorate, there cycle shifts. Trigger points are: when the credit fuelled bubble bursts, assets prices decline and there is an abrupt increase in margin requirements. While margin is primarily an important risk mitigation mechanism, it is also destabilising - leading financial markets to become further distressed and volatile. In such cases it does not take a significant asset price shift to make a material impact. With the slightest downward asset price fluctuation, leveraged positions can lose substantially¹¹⁹.

A credit fuelled boom exacerbates the situation. If new information signals an imminent downturn, holders of debt contracts, fearing possible losses, will ‘run’. The mere market players who receive the same information will see the same implications, resulting in a run¹²⁰.

In the modern era... A [run] is an event where holders of short-term debt issued by financial intermediaries withdraw en-masse¹²¹ (emphasis added).

Runs are not irrational events. They are caused by the arrival of bad news about the economy. Bad news causes debt contracts to become *sensitive* to information. For example, if parties to the CFT begin to question the FC backing the transaction, they can and are entitled to demand cash. If a large proportion of market participants do this, a system wide panic ensues¹²². A defining feature of a run is that a large number of market participants act at more or less the same time, making substantial demands for cash that the financial system is unable to meet demands for legal tender. In other words, liquidity promises can no longer be honored and this leads to solvency problems. In this sense, the financial system is insolvent; it cannot honour its contractual obligations¹²³. When assets prices crash due to runs from the SBS, market liquidity and funding liquidity shrink¹²⁴. Moreover, the downward price fluctuations of the asset disproportionately falls on the leveraged buyers, redistributing wealth away from those who value the assets the most to those who value them the least. When leveraged buyers lose wealth, they consequently often lose the ability to borrow resulting in less marketplace liquidity¹²⁵.

¹¹⁹ M K Brunnermeier and L H Pedersen, “Market Liquidity and Funding Liquidity” (2008) *The Society for Financial Studies* 1 at 1 – 3-8.

¹²⁰ G B Gorton, *Misunderstanding Financial Crises: Why We Don’t See Them Coming* (2012) 74.

¹²¹ G B Gorton, *Misunderstanding Financial Crises: Why We Don’t See Them Coming* (2012) 43.

¹²² G B Gorton, *Misunderstanding Financial Crises: Why We Don’t See Them Coming* (2012) 6.

¹²³ G B Gorton, *Misunderstanding Financial Crises: Why We Don’t See Them Coming* (2012) 33.

¹²⁴ A M Paccos, “shadow banking”, in A Marciano and GB Ramello (eds.), *Encyclopedia of Law and Economics* (2018) 1 at 6.

¹²⁵ European Systemic Risk Board, “The macroprudential use of margins and haircuts” (2017) 1 at 5.

Consider a CG who enters into a securities lending transaction and borrows €10 million worth of assets on 10% margin from the CT. The 10% margin component means that the CG must finance €1 million from its own capital (10% of €10 million) and borrows €9 million worth of assets. This means that the CG posts €10 million worth of FC but only receives €9 million worth of assets in return. Now, suppose that the value of the FC depreciates to €8 million. The CG, who posted FC worth €10 million has now lost €2 million and therefore sustaining a capital loss. Holding the 10% margin level means that the CG will most probably have to significantly reduce its overall position, which means selling assets exactly when the price is low in order to maintain the 10% margin¹²⁶.

Adverse shocks such as these can potentially have four significant and simultaneous consequences on the whole financial system. The first consequence of the adverse shock is the immediate impact of the CG's inability to fulfil their obligation under the securities lending transaction (or indeed any CFT). The adverse shock directly translates to a decline in the value of the FC, which will automatically trigger the CG to post additional FC, who may or may not have the means to do so.

The second consequence is the response by the CT. The CT will want to ensure that they do not end up in a worse financial position and will safeguard their financial position by accepting the additional posted FC and by increasing the margin requirements¹²⁷. This has two significant repercussions. Firstly, the adverse shock will immediately reduce funding liquidity. The shock will make the lender extremely cautious, and may either tighten funding or become unwilling to extend new funding into the marketplace. This will adversely affect market liquidity, investment and economic growth in the real economy; if CTs are unwilling to lend, then liquidity will start to dry-up. Secondly, assets will start to be bought and sold at fire sale prices, which will further depress the asset prices. For example, the CG will have to legally provide additional FC to the CT in order to fulfil its obligation under the transaction; equally, the CT may want to liquidate its own position by not rolling over the contract to minimise its loss.

¹²⁶ M K Brunnermeier and L H Pedersen, "Market Liquidity and Funding Liquidity" (2008) *The Society for Financial Studies* 1 at 1 – 7.

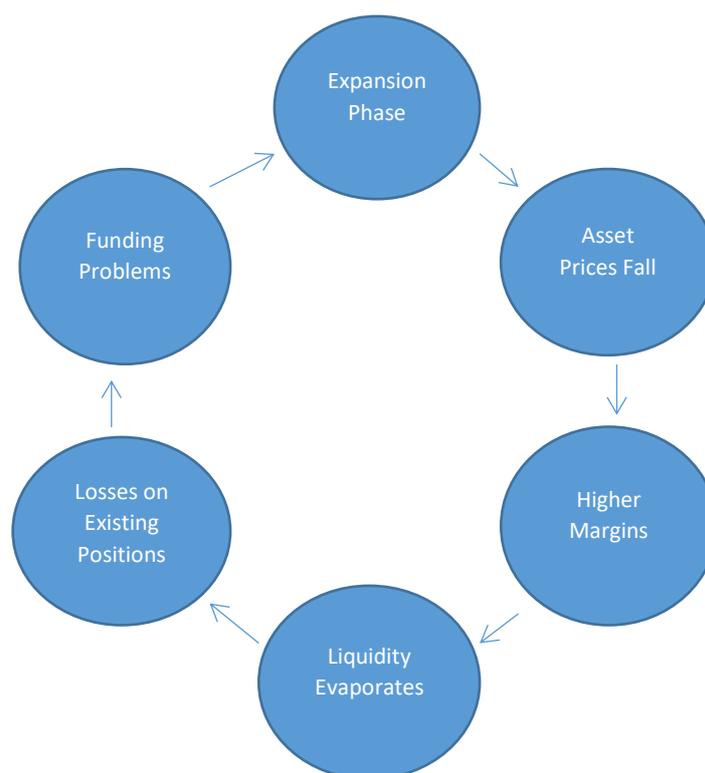
¹²⁷ A Krishnamurthy, "How Debt Markets Malfunctioned in the Crisis" (2010) *24 (1) Journal of Economic Perspectives* 3 at 12.

The third consequence is the downward price spiral. As the fire sale ensues, the prices of assets will decline in value, resulting in further losses. This triggers further fire sales and a rise in risk premiums as market participants ensure they either minimise loss or maximise profits.

The final consequence is a reduction in market liquidity. The lending and borrowing/buying and selling enjoyed prior to the adverse shock will be low because it will be difficult to transact in an overly cautious marketplace¹²⁸. The leverage spiral has thus caused liquidity to dry-up and during this stage of the cycle, there tend to be many defaults leading to a chain reaction of events with contagious consequences. For market participants in this position, declining asset prices can result in margin calls and the consequent de-leveraging of leveraged financial positions. Often bad news comes with increased volatility of economic fundamentals and the very vulnerability of market participants creates more uncertainty. As a result, a vicious cycle has emerged where lenders raise margin levels thereby demanding more FC, forcing de-leveraging and more asset sales at fire sale prices and thus further price declines until finally, the cycle resets and the whole process starts over¹²⁹. *Figure 3* below provides a visual depiction of the various stages in the liquidity/leverage cycle.

¹²⁸ M K Brunnermeier, “Deciphering the Liquidity and Credit Crunch 2007 - 2008” (2009) 23 (1) *Journal for Economic Perspectives* 77 at 91-94. See also, M K Brunnermeier and L H Pedersen, “Market Liquidity and Funding Liquidity” (2008) *The Society for Financial Studies* 1 at 3-7.

¹²⁹ V Constancio, “Margins and haircuts as a macroprudential tool” (6 June 2016) Vice-President of the ECB, at the *ESRB international conference of the macroprudential use of margins and haircuts*, available at: <https://www.esrb.europa.eu/news/speeches/date/2016/html/sp160606.en.html>; R Comotto, “Repo: guilty notwithstanding the evidence?” (25 April, 2012) *International Capital Markets Association*, available at: <https://www.icmagroup.org/assets/documents/Maket-Practice/Regulatory-Policy/Repo-Markets/Comotto%20-%20repo%20haircuts%20April%202012.pdf>; A Krishnamurthy, “How Debt Markets Malfunctioned in the Crisis” (2010) 24 (1) *Journal of Economic Perspectives* 3 at 11-12 and 19-20.

Figure 3¹³⁰

7. RECOMMENDATIONS AND CONCLUSION

Debt is an essential function of the SBS – it is the ‘technology for conducting trade’ and is a necessity for an economy to function effectively. The origins of debt lie in the TBS but given the growing demand, the SBS has created a functionally equivalent debt contract to that found in the TBS. The SBS does this through the use of CFTs where long term securities, such as government bonds, are used as FC to secure short-term funding. The tenor of the CFT is generally short-term, albeit routinely rolled-over, so there is confidence in immediacy. Margin is applied to the transaction to provide a time horizon financial buffer thereby adding a further layer of security.

In order for SBS produced debt to be ‘safe’, the assets used for FC and margin must be ‘information insensitive’. The key idea is that the asset has a credible underpinning. This mitigates the costly production of information given there is nothing (or minimal) information worth knowing. However, such assets are not completely riskless and the transition from information *insensitivity* to information *sensitivity* can be extremely damaging. Of course the

¹³⁰ This diagram is similar to, but slightly different from, that published by M K Brunnermeier and L H Pedersen, “Market Liquidity and Funding Liquidity” (2008) *The Review of Financial Studies* 1 at 4.

transition of an information *insensitive* government bond becoming information *sensitive* is very rare, but not inconceivable. Moreover, the fact that safe assets are now ‘scarce’, other forms of riskier assets are often relied upon to secure the debt contract. One way to mitigate the information *sensitivities* of debt is to apply higher margins at the point of trade.

Synonymous with information *insensitivity* is liquidity. The assets used for FC and margin have to be liquid if they are to be information insensitive. An asset that is liquid has money like equivalence in that it can be easily bought and sold in the marketplace without loss. When it is easy to raise funds in the market, funding liquidity is ‘high’, which means that markets are liquid. Indeed, more intermediation by the SBS results in more credit to the economy, which is important for production and consumption. In good times, when credit levels are high and market and funding liquidity are at an optimal, leverage levels are also high. The flipside is that more credit increases vulnerability. The fact that firms are highly leveraged directly translates into potential solvency problems if/when there is a shock to the system. If asset prices crash, the result is that market and funding liquidity simultaneously shrink. This means that market participants may find difficulty in raising funds to fulfil their obligations. The fact that margin levels will also rise to mitigate CTs’ losses, means that CGs will have to fund a higher proportion of the transaction with its own capital, which it may, or may not, be able to do. In this sense, margin is destabilising.

The author would like to introduce three plausible policy recommendations that may be useful to mitigate the vulnerabilities of debt within the SBS:

Recommendation 1

Before even considering the gargantuan task of regulating the SBS, the first logical recommendation should concentrate on gathering sufficient data because it is impossible (and ineffective) to regulate something if there is no data. By imposing more stringent reporting requirements on entities, activities and transactions will ultimately create a more comprehensive image of what effective and targeted regulation should look like¹³¹.

¹³¹ Articles 4 and 12 of the Securities Financing Transactions Regulation have reporting obligations – however, it is currently uncertain how effective these provisions are given that ESMA have recently issued a consultation on the matter. See ESMA, “Consultation on guidelines for reporting under Articles 4 and 12 SFTR” (29 July, 2019), available at: <https://www.esma.europa.eu/press-news/consultations/consultation-guidelines-reporting-under-articles-4-and-12-sftr>.

Recommendation 2

The second recommendation is the possible regulation of liquidity within the SBS. Within the TBS, liquidity is an issue comprehensively regulated under the LCR and the NSFR. Within the SBS, the use of financial collateral and the liquidity of those assets is left for market participants to decide. The general idea is that as long as the parties are in agreement about what securities are used as collateral, then it can be used as cash equivalent. Of course, this is dangerous given that many financial securities are highly volatile and subject to frequent and unpredictable intra-day price fluctuations. This situation becomes particularly acute given that these types of securities can theoretically be recursively reused.

The author recommends that collateral liquidity should be regulated by way of a minimum liquidity cap. This would mean that only certain pre-defined assets can be used to secure a collateralised transaction commonly used in the SBS. Assets such as cash or highly rated debt, namely Aaa government bonds or investment grade corporate bonds, for example¹³².

Since the GFC, the assets posted as collateral have, in general, taken a ‘flight to quality’. In practice, liquidity and the promise of cash immediacy are paramount when determining what is deemed ‘cash equivalent’. The BCBS/IOSCO and the RTS have helpfully provided EU market participants with an informative list, which outlines the most liquid and safest forms of collateral assets used to secure specific derivatives transactions¹³³:

- Cash;
- High-quality government and central bank securities;
- High-quality corporate bonds;
- High quality-covered bonds;
- Equities included in major indices; and,
- Gold

¹³² Of course, the list is not finite.

¹³³ Basel Committee on Banking Supervision and the Board of the International Organization of Securities Commissions, “Margin Requirements for non-centrally cleared derivatives” (March, 2015) 1 at 17-18, available at: <https://www.bis.org/bcbs/publ/d317.pdf>. See also Article 4 of the RTS, which provides a comprehensive list of eligible collateral types.

To be ‘eligible’, the asset must meet specific criteria, e.g. which currencies the FC may be in, what types of bonds/assets are allowed, and which haircuts are to be applied¹³⁴. Generally cash in the form of \$USD, £GBP, €Euro and ¥Yen and highly rated government securities of the USA, Canada, the Netherlands, Germany, UK, France and Belgium are the most liquid and therefore the most sought after form of eligibility¹³⁵. Depending upon which form of assets are used, the general rule is that as long as the assets are liquid, can be valued mark-to-market, meet the necessary regulatory requirements and the parties are in agreement, then the asset can be used as cash equivalent¹³⁶.

However, this matrix only applies to certain derivatives transactions, it does not apply to all collateralised financial transactions – namely repos and securities lending. The authors propose to develop this collateral matrix by recommending that it applies to all collateralised transactions. Any assets that do fall within this criteria would become ‘ineligible’ and the collateral taker would therefore have to notify the collateral giver, by delivering a “Legal Ineligibility Notice” outlining, amongst other things, the reasons why the assets do not fulfil the eligibility requirements¹³⁷.

Recommendation 3

The third recommendation of regulating the SBS is by limiting the amount of leverage an institution can hold – this can be done by minimum margin regulation. Within the SBS, leverage levels can theoretically be infinite¹³⁸. Prudentially regulated banks have comprehensive regulation with regard to the amount of leverage they are allowed to hold through Basel III’s minimum leverage ratio¹³⁹. The European Markets Infrastructure Regulation (“EMIR”) has also

¹³⁴ Paragraphs 10 and 11 (b) (ii), 1995 ISDA English Law CSA and Paragraphs 10 and 11 (c) (ii), 2016 English Law CSA for Variation Margin.

¹³⁵ See also, P C Harding and A J Harding, *A Practical Guide to the 2016 ISDA Credit Support Annexes for Variation Margin* (2018) Authors’ Foreword xi.

¹³⁶ G Yeowart, R Parsons, E Murray and H Patrick, *The Law of Financial Collateral* (2016) 64-65. See also, M Singh, “Collateral Reuse and Balance Sheet Space” (2017) *IMF Working Paper* 1 at 5.

¹³⁷ Paragraphs 9 (e) – (h) and 11 (c) (iii), 2016 English Law CSA for Variation Margin.

¹³⁸ Bank for International Settlements, “Repo Market Functioning” (2017) *CFGs Paper No. 59* 1 at 6. See also, J Cullen, “The repo market, collateral and systemic risk: in search of regulatory coherence”, in I H Y Chiu and I G MacNeil, *Research Handbook on Shadow Banking Legal and Regulatory Aspects* (2018) 85 at 93-94; European Systemic Risk Board, “ESRB opinion to ESMA on securities financing transactions and leverage under Article 29 of the SFTR” (October, 2016) 1 at 5; P C Harding and C A Johnson, *A Practical Guide to Using Repo Master Agreements* (2017) 14.

¹³⁹ Basel Committee on Banking Supervision, “Basel III: Finalising post-crisis reforms” (2017) *Bank for International Settlements* 1 at 140, available at: <https://www.bis.org/bcbs/publ/d424.pdf>. See also, Article 429 of Regulation (EU) No 575/2013 of the European Parliament and of the Council of 26 June 2013 on prudential requirements for credit institutions and investment firms and amending Regulation (EU) No 648/2012 (“CRR”); Article 87 of Directive 2013/36/EU of the European Parliament and of the Council of 26 June 2013 on access to

made real progress in the OTC derivatives markets by increasing the use of central clearing. Article 41 of the EMIR requires central counterparties to impose, call and collect margin. Furthermore, the Regulatory Technical Standards 153/2013 (“RTS”) provides alternative options linked to pro-cyclicality, leverage and margin¹⁴⁰. In particular, both the RTS and the EMIR are designed to limit the build-up of leverage in OTC derivatives markets that are subject to central clearing.

Alternative investment fund managers (“AIFMs”) also have a leverage framework under the Alternative Investment Fund Managers Directive (“AIFMD”)¹⁴¹. As part of their risk management process, AIFMs set a maximum level of leverage which they may employ on behalf of every alternative investment fund (“AIF”) they manage, as well as the extent of the collateral reuse right that could be granted under the leveraging arrangement¹⁴².

Reforms in other areas, such as the Securities Financing Transactions Regulation (“SFTR”) and the Undertakings for Collective Investment in Transferable Securities Directive (“UCITS”), however, have been less convincing. Under the SFTR, where repos and securities lending transactions play a central role, the substantive progress made on leverage and the use of margin is debateable¹⁴³. The same is true of the guidelines published by the European Securities and Markets Authority (“ESMA”) on issues related to the UCITS, which specify the requirements around efficient portfolio management and risk management processes in greater detail. In particular, the use of collateral and the requirements for “conservative” haircuts¹⁴⁴.

the activity of credit institutions and the prudential supervision of credit institutions and investment firms, amending Directive 2002/87/EC and repealing Directives 2006/48/EC and 2006/49/EC (“CRD”).

¹⁴⁰ Commission Delegated Regulation (EU) No 153/2013 of 19 December 2012 supplementing Regulation (EU) No 648/2012 of the European Parliament and of the Council with regard to regulatory technical standards on requirements for central counterparties, L 52, OJ 23.2.2013, page 41.

¹⁴¹ Directive 2011/61/EU of the European Parliament and of the Council of 8 June 2011 on Alternative Investment Fund Managers and amending Directives 2003/41/EC and 2009/65/EC and Regulations (EC) No 1060/2009 and (EU) No 1095/2010 (“AIFMD”).

¹⁴² Articles 15 (4) and 25 of the AIFMD.

¹⁴³ European Securities and Markets Authority, “Report on securities financing transactions and leverage in the EU” (2016) *ESMA/2016/1415* 1 at 37 – 39, available at:

https://www.esma.europa.eu/sites/default/files/library/2016-1415_-_report_on_sfts_procyclicality_and_leverage.pdf.

¹⁴⁴ European Securities and Markets Authority, “Report on securities financing transactions and leverage in the EU” (2016) *ESMA/2016/1415* 1 at 37 – 39, available at:

https://www.esma.europa.eu/sites/default/files/library/2016-1415_-_report_on_sfts_procyclicality_and_leverage.pdf.

Yet the reciprocal of leverage is margin¹⁴⁵. This means that in practice, infinite leverage comes up against a significant problem – margin. Margin requirements applied to any given collateralised transaction ensures that leverage can be limited – this holds true provided that market participants cannot fund their margin requirements through unsecured borrowing¹⁴⁶. Markus Brunnermeier notes that because the CG must finance margin with its own capital, it is not possible to borrow the amount equal to the market value of the collateral¹⁴⁷. To put it another way, margin requirements determine the maximum amount that a party can borrow when using a given security as collateral¹⁴⁸. The fact that leverage lies at the heart of many past financial crises¹⁴⁹ the author proposes adopting minimum margin regulation to mitigate the procyclical effects that follow from subsequent through the cycle leverage and liquidity spirals¹⁵⁰.

¹⁴⁵ J Geanakoplos, “The Leverage Cycle” (2010) *1715R Cowles Foundation Discussion Paper* 1 at 1-2.

¹⁴⁶ European Systemic Risk Board, “The macroprudential use of margins and haircuts” (2017) 1 at 25.

¹⁴⁷ M K Brunnermeier, “Deciphering the Liquidity and Credit Crunch 2007-2008” (2009) 23 (1) *Journal of Economic Perspectives* 77 at 91-92. See also, European Systemic Risk Board, “The macroprudential use of margins and haircuts” (2017) 1 at 25.

¹⁴⁸ V Constancio, “Margins and haircuts as a macroprudential tool” (6 June 2016) Vice-President of the ECB, at the *ESRB international conference of the macroprudential use of margins and haircuts*, available at: <https://www.esrb.europa.eu/news/speeches/date/2016/html/sp160606.en.html>.

¹⁴⁹ Such as, the Wall Street Crash of 1927-1929, the Japanese Banking Crisis of 1991, the financial derivatives crisis in 1994 that bankrupted Orange County in California, the 1998 emerging markets mortgage crisis that collapsed Long-Term Capital Management the more recent 2007 GFC. See, M Schularick and A M Taylor, “Credit Booms Gone Bust: Monetary Policy, Leverage Cycles, and Financial Crises, 1870 - 2008” (2012) *102 (2) American Economic Review* 1029 – 1061.

¹⁵⁰ A M Paccès and H Nabilou, “The Law and Economics of Shadow Banking” (2017) *ECGI Working Paper Series in Law*. See also, V Constancio, “Margins and haircuts as a macroprudential tool” (6 June 2016) Vice-President of the ECB, at the *ESRB international conference of the macroprudential use of margins and haircuts*, available at: <https://www.esrb.europa.eu/news/speeches/date/2016/html/sp160606.en.html>; European Systemic Risk Board, “The macroprudential use of margins and haircuts” (2017); Bank for International Settlements, “Repo Market Functioning” (2017) *CFGS Paper No. 59*; M K Brunnermeier, “Deciphering the Liquidity and Credit Crunch 2007-2008” (2009) 23 (1) *Journal of Economic Perspectives* 77; J Cullen, “The repo market, collateral and systemic risk: in search of regulatory coherence”, in I H Y Chiu and I G MacNeil, *Research Handbook on Shadow Banking Legal and Regulatory Aspects* (2018) 85; J Geanakoplos and L H Pedersen, “Monitoring Leverage” in M Brunnermeier and A Krishnamurthy (eds) *Risk Topography: Systemic Risk and Macro Modeling* (2014) 113; Financial Stability Board (Press Release), “FSB adjusts implementation timelines for its policy recommendations to address financial stability risks in securities financing transactions” (19 July, 2019).