# Collateral transactions and shadow banking

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# 6 The role of debt in the EU shadow banking sector[1]

## 1 INTRODUCTION

An essential pillar of collateral transactions in the shadow banking sector is the creation of 'safe' debt by way of maturity transformation – 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 shadow banking sector has therefore managed to successfully replicate the functions of the traditional banking sector by creating a variant of demandable debt, which is short-term, not subject to deposit insurance and credibly backed by a direct claim on liquidity.[2]

However, the shadow banking sector cannot produce 'riskless' debt. Because debt in the shadow banking sector 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 including margining. This makes shadow banking sector produced debt 'runnable'. In the shadow banking sector, 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.

This chapter will be structured as follows. Section 2 will discuss debt – what it is and its rationale. The fact that the origin of debt is rooted in the traditional banking sector, it is useful to first provide a tangible illustration of its operation therein before going on to discuss debt as it operates in the EU shadow banking sector. Section 3 will explore the information sensitivities

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1 The chapter contains and builds upon the following work previously published by the author: R Spence, "The Vulnerabilities of Debt in the Shadow Banking Sector" (28-29 October, 2019) *Financial Stability Conference Paper, Berlin* 1-33, available at: http://financial-stability.org/wp-content/uploads/2019/11/2019_FSC-WS_PAPER_Spence_Vulnerabilities-of-debt-in-the-shadow-banking-sector.pdf. Also, R Spence, "The Role of Shadow Banking in the Capital Markets Union" (2019) in *Major Trends in Banking Union and Capital Markets Union: Jean Monnet Project – Reform of Global Governance of EMU* 75-101.

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

of debt. Information *insensitive* debt holds that the assets used for financial collateral and margining purposes must be high quality, liquid and thus 'safe'. This position can be contrasted with a share, which by design is *sensitive* to information. Section 4 highlights the importance of liquidity. All financial market transactions depend upon the ability to obtain funding, which can only happen if markets are liquid. Funding liquidity and market liquidity are, therefore, tantamount to maintaining the safety of debt contracts. Section 5 analyses the vulnerabilities of debt. Debt is designed to be safe, however, the flipside is that debt is also extremely vulnerable. Section 6 concludes.

## 2 DEBT

### 2.1 What is Debt?

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 by offering deposits. 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 efficiently.[3] There is an obvious demand for money by households and firms, and banks/shadow banks are the entities who cater for this demand by supplying money through a debt contract – it is an essential feature of market economies.

In its simplest form, debt is an obligation that follows from 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 shadow banking sector is collateral transactions where the collateral taker sells/lends money or assets and in return the collateral giver promises to repay upon maturity of the contract. In other words, a collateral transaction 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 traditional banking sector created debt through demand deposits, but demand has now grown and the shadow banking sector has, in fact, successfully replicated the functions of debt originally found in the traditional banking sector.[4] Before going on to discuss the role debt plays in the shadow banking sector, it is worthwhile to briefly explore the role of debt as it operates

3 G B Gorton, *Misunderstanding Financial Crises: Why We Don't See Them Coming* (2012) 45-46.
4 P Mehrling, *The New Lombard Street: How the Fed Became the Dealer of Last Resort* (2011) 72-77.

in the traditional banking sector. This will prove useful in not only understanding debt but crucially how collateral transactions in the shadow banking sector have mimicked the unique ability of the traditional banking sector to credibly promise liquidity on demand.

### *2.1.1 Traditional banking sector*

Within the traditional banking sector, 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".[5] Consequently, the actual cash reserves held by a bank typically amount to a small proportion of their outstanding deposits – hence the concept: '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 tender.[6]

Banks attract demandable debt by giving depositors a short-term, safe and insured option to house their capital, whilst promising at par liquidity on demand.[7] 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.[8] From the perspective of the depositor, its funds are completely safe (even if there is a bank run).[9] With the advent of the European Deposit Guarantee Scheme, banks

5 Speech by President Franklyn Roosevelt, "The Banking Crisis" (12 March, 1933). See also, Gorton (n 3) 115.

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

7 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, Gorton (n 3) 45.

8 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"). 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 national Deposit Guarantee Scheme. On this, see Commissioner Lord Hill at the Press Conference on the EDIS Proposal at the European Parliament on 24 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.

9 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,

operating in the traditional banking sector are, according to Gary Gorton, able to produce 'riskless' debt.[10] Yet this thesis remains sceptical about the term 'riskless'. This term implies that there is no risk and given that finance is inherently unpredictable, if the broader institutions underpinning the European Deposit Guarantee Scheme fail, intuitively, the consequences could be cataclysmic. In addition, there is also the issue of 'payout' risk – the time lag before depositors are fully reimbursed. While insured deposits imply safety, if depositors have to wait a period of time, for example seven days, the obvious outcome is an *en-masse* bank run – which in itself is a risk. In this regard, payout risk appears to be a major chink in the armour of the European Deposit Guarantee Scheme given that payout is not instantaneous.[11]

*Figure 11* below depicts the traditional banking sector and illustrates the standard way that banks issue debt, which subsequently becomes a 'money multiplier' through deposit taking and loan making.

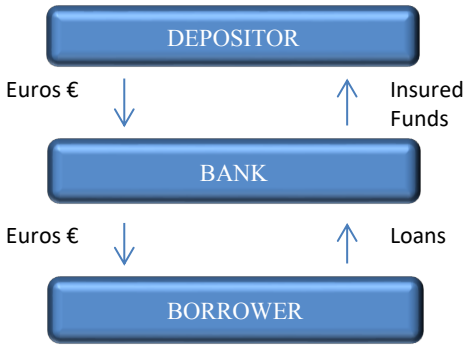


*Figure 11: Traditional Banking Sector*

*Figure 11* illustrates that there is a depositor who deposits money with a bank. The bank uses this money by lending funds to a borrower who, for instance, requires money for a mortgage. In return, the claim the bank will receive, which will be collected upon over time, is the loan itself. The bank, therefore,

Single Resolution Board, "Banco Popular" (7 June, 2018) available at: https://srb.europa.eu/en/content/banco-popular.

10 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, Gorton (n 3).

11 See generally, M Gerhardt and K Lannoo, "Options for reforming deposit protection schemes in the EU" (2011) *European Credit Research Institute Policy Brief No. 4.*

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 demand.[12] 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 traditional banking sector.[13]

### *2.1.2 Shadow banking sector*

Demand deposits are of no practical use to institutions and private individuals operating in the shadow banking sector.[14] The fact that these entities often 'deposit' large amounts of money for short periods of time ensures that the European Deposit Guarantee Scheme threshold would be exceeded and anything above € 100,000 is uninsured (and subject to bail-in[15]). Meaning that an entity depositing more than € 100,000 in the traditional banking sector could face a capital loss should the bank face difficulties.[16]

Most market participants understandably prefer risk free liquid claims. As such, the shadow banking sector has created an alternative of demandable debt not subject to prudential regulation and credibly backed by a direct claim on liquidity.[17] Within the shadow banking sector, when market participants want a safe place to house their capital, raise funds or borrow securities, they generally do so through the use of collateral transactions. The shadow banking sectors' distinctive liquidity guarantee arises from their issuing of collateralised financial credit in repo, securities lending and derivatives transactions.[18] As

12 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.

13 Ricks (n 6) 75 at 76-78.

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

15 The European Deposit Guarantee Scheme only insures deposits of up to EUR €100,000 in the EU. Therefore, anything above this amount that is deposited within a credit institution becomes 'unsecured' and subject to 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 of the European Parliament and of the Council of 15 May 2014 establishing a framework for the recovery and resolution of credit institutions and investment firms and amending Council Directive 82/891/EEC, and Directives 2001/24/EC, 2002/47/EC, 2004/25/EC, 2005/56/EC, 2007/36/EC, 2011/35/EU, 2012/30/EU and 2013/36/EU, and Regulations (EU) No 1093/2010 and (EU) No 648/2012, of the European Parliament and of the Council ("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.

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

17 Perotti (n 8) 1 at 1.

18 See generally, Benjamin *et al* (n 2).

illustrated by *Figure 12* below, the shadow banking sector is functionally equivalent to the traditional banking sector because debt contracts in the shadow banking sector are backed by financial collateral just as debt contracts in the traditional banking sector are backed by the European Deposit Guarantee Scheme.

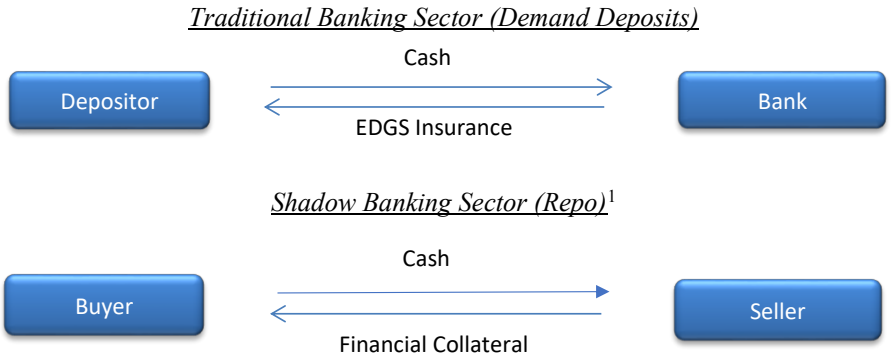


*Figure 12: Functional Equivalence of Traditional Banking and Shadow Banking*

In both transactions outlined above in *Figure 12*, debt is designed to be safe. In a repo transaction, for example, generally the maturity of a repo is short-term with the debt contract rolled over (renewed) on a daily (or short-term) basis.[19] This infers a confidence in immediacy due to its short maturity as it is routinely rolled over.[20] In addition, AAA government bonds are often used as financial collateral to secure the repo and the safety of the debt contract is dependent upon the quality of the financial collateral (and the applicable level of margin). AAA government bonds are deemed the highest quality, most liquid and therefore safest form of financial collateral 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.

19 International Capital Markets Association, "what is the role of repo in the financial markets" (accessed 1 November, 2019), available at: https://www.icmagroup.org/Regulatory-Policy-and-Market-Practice/repo-and-collateral-markets/icma-ercc-publications/frequently-asked-questions-on-repo/3-what-is-the-role-of-repo-in-the-financial-markets/. In addition, 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.

20 The opposite is also the case where the buyer in the repo can demand cash back by not rolling over the repo. See Perotti (n 8) 1 at 1.

#### *2.1.2.1 Trading at par*

Trading at par is trading at 'equal to face value'. Within the shadow banking sector, the market practice of 'trading at par' encompasses three concepts: mark-to-market, margin maintenance and margin. These three mechanisms combined maintain the market value of the financial collateral at a fixed exchange in relation to the debt. For instance, a typical collateral transaction is mark-to-market (generally daily). Should the value of the financial collateral rise or fall, a margin call will be made requiring the respective party to post additional securities or cash to maintain the fixed 'at par' exchange of the transaction.[21]

#### *2.1.2.2 The creation of shadow money*

> *"Everyone can create money, the problem is to get it accepted".*[22]

The use of financial collateral and leverage are central to the creation of shadow money. For instance, it is common practice for a collateral giver, such as a hedge fund, to spend € 100,000 from its own equity reserves to buy an asset worth 10 times as much (€ 1million).[23] Collateral transactions facilitate these sorts of transactions through the reuse of financial collateral, which enables financial institutions to leverage their position using an already leveraged instrument.[24] For instance, market participants raise cash through a repo transaction and this cash is used to buy securities, which are subsequently repoed out in return for more cash, which is used to buy more securities and so on.[25] With every transaction the leverage ratio increases because the reuse of financial collateral is a "money multiplier" allowing market participants to recursively leverage their positions.[26] This is the standard way that money is created in the shadow banking sector.[27]

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21 Gabor and Vestergaard (n 16) 1 at 11-12.

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

23 This means that the hypothetical transaction has a 10% margin: €1million/€100,000 = 10 (or a leverage ratio of 10:1).

24 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.

25 Bank for International Settlements, "Repo Market Functioning" (2017) *CFGS Paper No. 59* 1 at 6. See also, Cullen (n 25) 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.

26 Cullen (n 25) 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) *Institute for New Economic Thinking*.

27 See generally, Gabor and Vestergaard (n 16).

*2.1.2.3 The role of margin*

Margin is applied to the transaction to add a further layer of safety.[28] 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 collateral transaction know that there is enough financial collateral, more precise information about the financial collateral becomes irrelevant and does not impair liquidity in the market. The key idea is that the collateral taker is confident that should default occur, the financial collateral can be liquidated to make good on the initial promise.[29] The margin (overcollateralisation) component is crucial because it acts as a time horizon financial buffer thus taming uncertainty.

Secondly, margin limits leverage. While leverage levels can theoretically be infinite, it is important to note that although leverage is a multiplier of gains, the flipside is, leverage 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 equity.[30] The hedge fund is then able to buy an asset worth € 1million for € 100,000.[31] The fact that this debt contract is generally backed by safe financial collateral and the transaction is sufficiently overcollateralised, gives the collateral taker 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 collateral giver's own equity and vice versa. In practice, it is up to the parties to decide on the appropriate level of margin but as a general rule, the higher the quality of the financial collateral (such as AAA government bonds) the lower the margin and, conversely, the lower the quality of the financial collateral (such as shares) the higher the margin. The fact that the margin is first to be absorbed in a stressed situation, gives the collateral taker time to liquidate the financial collateral 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.

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28 Gorton (n 10) 1 at 30.

29 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 Krishnamurthy (n 14) 3 at 8 where it is stated that lenders will typically set the margin high enough to avoid any detailed analysis.

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

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

## 3 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".*[32]

### 3.1 Information Insensitive Debt and Safe Assets

> *"Debt is designed to be… information insensitive"*[33]

In order for the shadow banking sector to produce safe and liquid debt, the assets used for financial collateral 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 news.[34] 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 collateral transactions 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'.[35]

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),[36] 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".[37] Yet, when an asset moves from being information *insensitive* (safe – but not risk free) to one where market participants begin to question the safety of the asset – it becomes information *sensitive* (unsafe)[38]. The transition from information *insensitivity* to information

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32 Gorton (n 3) 58.
33 *Ibid* at 137.
34 Holmstrom (n 29) 1 at 9.
35 As to how a Aaa Dutch government bond (or equivalent) is a safe asset was discussed in Chapter 3, section 3.2.1 "*The debt and equity dichotomy*". See also, C Garcia, "Misunderstanding Financial Crises, A Q&A with Gary Gorton" (25 October, 2012) *Financial Times Alphaville.*
36 Or Ukraine in 2016 or Venezuela in 2017.
37 Garcia (n 35).
38 Information sensitive assets will be discussed in the chapter in greater detail below, see section 3.2 "Information sensitive debt".

*sensitivity* can be damaging because as speculators learn of secret information, they will take advantage of the less informed in a trade.[39] This is why debt contracts in the shadow banking sector are 'runnable' – *en-masse* demands by holders of debt for cash.[40]

## 3.2 Information Sensitive Debt

> *"Debt is contaminated by the secrets problem".*[41]

While much of the discussion thus far has focused on AAA government bonds and cash as a source of financial collateral, it should be noted that there is not an infinite supply of safe assets. Often, other forms of riskier financial collateral are relied upon to secure a transaction.[42] These include lower graded debt (corporate bonds) and equity (shares). For example, equity in the form of a company share, used for financial collateral and margining purposes, is volatile; it is subject to frequent and unpredictable intraday market price fluctuations, precisely because such an asset is *sensitive* to information. The fact that information is relevant for the price of a share,[43] the 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 otherwise.[44]

While equity is an important source of financial collateral, fluctuations can and do cause problems. If the financial collateral plummets in value, it will subsequently lead to the obligation to post additional financial collateral 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 crises.[45]

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39 Holmstrom (n 29) 1 at 15. See also, Gorton (n 10) 1 at 3-4 and 7.

40 Runnable debt has been described by several commentators as an important precursor to crises. In its simplest form, runnable debt is produced by the traditional banking sector, in the form of demand deposits. As to how shadow banking sector created runnable debt is discussed in this chapter above, see section 2.1.2.2 "*The creation of shadow money*". See also, Gorton (n 3) 9.

41 Gorton (n 3) 51.

42 M Singh, *Collateral and Financial Plumbing* (2016) 1.

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

44 Holmstrom (n 29) 1 at 5-7.

45 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.

## 4 LIQUIDITY

### 4.1 Introduction

*"Liquidity is tantamount to shiftability".*[46]

A characteristic of collateral transactions is the implied liquidity of the financial collateral/margin underpinning the obligation, which ensures the debt contract remains information *insensitive*.[47] According to John Maynard Keynes an asset is liquid if its value is "more certainly realizable at short notice without loss".[48] If the financial collateral 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 financial collateral/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 collateral holds its value over time; and, unit of account, which ensures that the collateral can be easily translated into prices.[49]

As noted in Chapter 3, 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; 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 immediacy.[50] However, in truth no financial asset fully meets these 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 has a sufficient amount of time to liquidate the financial collateral.

### 4.2 Market Liquidity and Funding Liquidity

Collateralised financial credit has become a primary source of funding, which is crucial for creating and maintaining liquid markets. All transactions are, indeed, dependent upon the availability of funding and such funding can only be obtained if markets are liquid.[51] Secondary markets are considered liquid

46 H G Moulton, "Commercial Banking and Capital Formation" (1918) *Journal of Political Economy* 726.
47 Gorton (n 3) 47.
48 J M Keynes, *A Treatise on Money – Volume 2* (1930) 67.
49 See generally, Mehrling (n 4).
50 P O Gourinchas and O Jeanne, "Global Safe Assets" (2012) *399 BIS Working Paper* 1 at 4.
51 Krishnamurthy (n 14) 3 at 9.

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 financial collateral) in the primary market – this is often referred to as funding liquidity.[52] When market participants obtain funding and post high quality assets for funding liquidity 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 versa.[53]

### *4.2.1 Funding liquidity*

As noted in Chapter 3, funding liquidity describes the ease with which market participants can raise funding. In good times, when funding liquidity is high, markets can be said to be liquid due to the "ability to settle obligations with immediacy".[54] Leveraged market participants raise money through a collateral transaction by securing the transaction with financial collateral, 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 collateral taker to either become unwilling to extend new funding or, alternatively, enter into a new master agreement with updated terms, such as with higher margin requirements.[55] Either way, the collateral taker restricts funding resulting in liquidity 'drying up'.

Funding liquidity risk manifests itself in three forms and all are interrelated. The first form is margin risk, which involves increasing margin levels to take account of falling financial collateral values. When margin levels increase, it is a systemic indicator. Increasing margins have, indeed, been noted

52 A M Pacces, "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.*

53 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, Mehrling (n 4) 110; M K Brunnermeier, "Deciphering the Liquidity and Credit Crunch 2007 - 2008" (2009) 23 (1) *Journal for Economic Perspectives* 77 at 91.

54 M Drehmann and K Nikolaou, "Funding Liquidity Risk: definition and measurement" (2009) *1024 ECB Working Paper Series* 1 at 10. See also generally, Brunnermeier and Pedersen (n 52); Brunnermeier (n 54) 77 at 77-79.

55 Gorton (n 10) 1 at 1.

to being a precursor to crises.[56] 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 date[57]), thereby ensuring confidence and supporting long term lending.[58] 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 marketplace – this is the final form of risk, known as redemption risk – *"with no credit, there is no investment, and there is a recession"*[59].

### *4.2.2 Market liquidity*

Market liquidity was also discussed in Chapter 3 and 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 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 reduced.[60] 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 liquidity.[61] The lower the bid/ask spread the higher the market liquidity and, the higher bid/ask spread, the lower the market liquidity.[62] 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.

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56 See generally, G Gorton. "Financial Crises" (30 January, 2018) *Annual Review of Financial Economics.*

57 Mehrling (n 4) 68.

58 Perotti (n 8) 1 at 1.

59 Gorton (n 3) 176-177.

60 Keynes (n 49) 67-68.

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

62 Brunnermeier (n 53) 77 at 92.

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 supply.[63]

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 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 uncertainty.[64]

### 4.3 The Interaction between Market Liquidity and Funding Liquidity

High market and funding liquidity are 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.[65]

## 5 THE VULNERABILITIES OF DEBT

### 5.1 The Two Faces of a Debt Contract

The problem with collateral transactions in the EU shadow banking sector is debt and its vulnerability. Debt relationships in the shadow banking sector 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 deteriorate.[66]

> *"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*

63 J Muranaga, "Dynamics of market liquidity" (2000) *Bank for International Settlements* 1 at 2-3. See also, Brunnermeier (n 54) 77 at 92.

64 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.

65 Pacces (n 52) 1 at 3-4 and 6. See also generally, Brunnermeier and Pedersen (n 52).

66 Pacces (n 52) 1 at 15.

> *is like a dose of morphine, the effect of which is fine while it lasts but it is followed by the inevitable reaction".*[67]

Within the shadow banking sector, 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 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 coin.[68]

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 spending.[69] The interaction of balance sheets is the source of what monetary economist Ralph Hawtrey described as the "instability of credit".[70]

According 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 Hawtrey.[71]

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 boom[72] typically involves both aspects – "if you don't catch the bubble early, it may be impossible to do anything".[73] 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 been at the heart

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67 Earl Dean Howard, "What Currency Reform Means to the Businessman" (15 September, 1906) 726. See also, Gorton (n 3) 73.

68 Mehrling (n 4) 11.

69 Mehrling (n 4) 12.

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

71 Mehrling (n 4) 15.

72 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 Gorton (n 3) 59.

73 Mehrling (n 4) 12-13 and 15.

of many past financial crises, it is disappointing that margin is a mechanism that is largely overlooked by regulators.[74]

## 5.2 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"?*.[75] 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 a cumulative upward spiral.[76]

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 financial collateral will 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 financial collateral backing the transaction. Greater leverage for the economy as a whole allows greater investment – at the price of greater fragility.[77]

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 financial collateral to borrow against. The flipside is that increasing levels of leverage increases the asset owners' vulnerability, especially against the backdrop that most collateral transactions are subject to funding and market liquidity risk.[78]

When the good times of low margins, high leverage and liquid markets inevitably start to deteriorate, the cycle shifts. Trigger points are: when the

74 Strong credit growth has been observed before many famous crises, such Argentina in 1980, Sweden, Norway and Finland in 1997 and the most recent Global Financial Crisis. 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 Gorton (n 3) 45.

75 Gorton (n 3) 75.

76 Mehrling (n 4) 7.

77 Gorton (n 3) 179.

78 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.

credit fuelled bubble bursts, asset 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 substantially.[79]

A credit fuelled boom exacerbates the situation. If new information signals an imminent downturn, holders of debt contracts, fearing possible losses, will 'run'. The more market players who receive the same information will see the same implications, resulting in a run.[80]

> *In the modern era… A [run] is an event where holders of short-term debt issued by financial intermediaries withdraw en-masse.*[81]

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 collateral transaction begin to question the financial collateral backing the transaction, they can and are entitled to demand cash. If a large proportion of market participants do this, a system wide panic ensues.[82] 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 liquid assets. In other words, liquidity promises can no longer be honoured and this leads to solvency problems. In this sense, the financial system is insolvent; it cannot honour its contractual obligations.[83] When asset prices crash due to runs from the shadow banking sector, market liquidity and funding liquidity shrink simultaneously.[84] Moreover, the downward price fluctuations of the asset disproportionately fall 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 liquidity.[85]

During the crisis stage of the leverage cycle, there tend to be many defaults and these defaults often lead 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

79 Brunnermeier and Pedersen (n 52) 1 at 1 and 3-8.
80 Gorton (n 3) 74.
81 *Ibid* at 43 *(emphasis added).*
82 *Ibid* at 6.
83 *Ibid* at 33.
84 Pacces (n 52) 1 at 6.
85 European Systemic Risk Board, "The macroprudential use of margins and haircuts" (2017) 1 at 5.

financial positions. Often bad news comes with increased volatility of economic fundamentals and the very vulnerability of the buyers creates more uncertainty. As a result, a vicious cycle can emerge where lenders raise margin levels thereby demanding more financial collateral, forcing de-leveraging and more asset sales at fire sale prices and thus further price declines, eventually generating a downward leverage and liquidity spiral.[86] This is what Gary Gorton and Andrew Metrick called "the run-on repo" during the Global Financial Crisis.[87] The aftermath of the leverage and liquidity cycle results in a long period where many investors are close to insolvency, and thus unable to borrow and equally unwilling to make productive investments.[88] *Figure 13* below provides a visual depiction of the various stages in the leverage spiral.

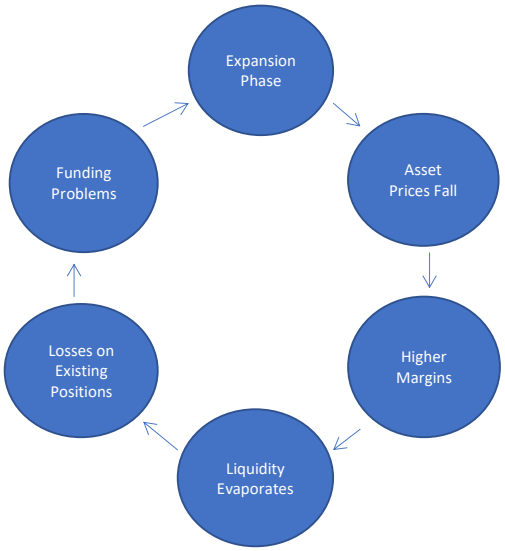


*Figure 13: Leverage and Liquidity Spiral*[89]

86 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%202.pdf.

87 G B Gorton and A Metrick, "Securitized Banking and the Run-on Repo" (2009) *15223 NBER Working Paper Series*. See also, G B Gorton and A Metrick, "Who Ran on Rep?" (2012) *18455 NBER Working Paper Series*.

88 J Geanakoplos, "The Leverage Cycle" (2010) *1715R Cowles Foundation Discussion Paper* 1 at 10. See also, Geanakoplos and Pedersen (n 79) 113 at 117 -118.

89 This diagram is similar to, but slightly different from, that published by Brunnermeier and Pedersen (n 52) 1 at 4.

## 6 CONCLUSION

To conclude, debt is an essential function of collateral transactions in the shadow banking sector – it is the 'technology for conducting trade' and is a necessity for an economy to function effectively. The origins of debt lie in the traditional banking sector but given the growing demand, the shadow banking sector has created a functionally equivalent debt contract to that found in the traditional banking sector. The shadow banking sector does this through the use of collateral transactions where long-term securities, such as government bonds, are used as financial collateral to secure short-term funding. The tenor of the collateral transaction 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 shadow banking sector produced debt to be 'safe', the assets used for financial collateral 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 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 financial collateral 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 shadow banking sector 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 collateral takers' losses, means that collateral givers 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 can be destabilising.