

Handbooks in Central Banking

No. 16

REPO OF GOVERNMENT SECURITIES

Simon Gray

Series editor: Robert Heath

Issued by the Centre for Central Banking Studies,
Bank of England, London EC2R 8AH
Telephone 0171 601 5857, Fax 0171 601 5860
November 1998

© Bank of England 1998
ISBN 1 85730 136 6

Foreword

The series of *Handbooks in Central Banking* has grown out of the activities of the Bank of England's Centre for Central Banking Studies in arranging and delivering training courses, seminars, workshops and technical assistance for central banks and central bankers of countries across the globe.

Drawing upon that experience, the *Handbooks* are therefore targeted primarily at central bankers, or people in related agencies or ministries. The aim is to present particular topics which concern them in a concise, balanced and accessible manner, and in a practical context. This should, we hope, enable someone taking up new responsibilities within a central bank, whether at senior or junior level, and whether transferring from other duties within the bank or arriving fresh from outside, quickly to assimilate the key aspects of a subject, although the depth of treatment may vary from one *Handbook* to another. We hope they will also be helpful to those with some experience, but who are facing new problems as the economy and markets develop. While acknowledging that a sound analytical framework must be the basis for any thorough discussion of central banking policies or operations, we have generally tried to avoid too theoretical an approach. The *Handbooks* are not intended as a channel for new research.

We have aimed to make each *Handbook* reasonably self-contained, but recommendations for further reading may be included, for the benefit of those with a particular specialist interest. The views expressed in the *Handbooks* are those of the authors and not necessarily those of the Bank of England.

We hope that our central banking colleagues around the world will continue to find the *Handbooks* useful. If others with an interest in central banking enjoy them too, we shall be doubly pleased.

We would welcome any comments on this *Handbook* or on the series more generally.

Robert Heath
Series Editor

REPO OF GOVERNMENT SECURITIES

Simon Gray

Contents

Page

Abstract	3
1. Introduction	5
2. What is a repo	6
a) Accrued interest and pricing of the securities	10
b) Hold-in-custody (HIC) repo	11
c) Tri-partite Repo	11
d) Collateral pooling.....	12
3. A generalised repo market	13
4. Restricted use of repo	14
5. Market structure and supervision	18
a) Legal documentation	20
b) Code of best practice	21
c) Settlement	21
d) Monitoring the market	22
6. Accounting issues	22
7. Statistical Treatment	25
8. Tax issues	27
Annex 1 Classic repo vs Sell and Buy-Back	28
Annex 2 The key elements of a master repo legal agreement	30
Annex 3 The code of practice - key elements	31
Annex 4 Repo Settlement	32
Annex 5 Monitoring the market	33
Annex 6 Margining	34
Annex 7 Collateral Pricing.....	37
Annex 8 Extracts from BoE 1998 accounts	39
Annex 9 Example calculations of Gilt Repo Transactions.....	41
Further Reading	44

ABSTRACT

“Repo” is short for “sale and repurchase agreement”, where one party agrees to sell bonds or other financial instruments to another party, with an agreement to repurchase equivalent securities in the future, under a formal legal agreement. It is widely used in financial markets as an alternative to collateralised lending as it can fulfil the same economic function while offering greater flexibility and better security. Repo is increasingly being used by central banks in their own monetary operations, and can also be important in the development of liquid financial markets in emerging economies.

This handbook describes in some detail the structure of repo transactions and the various safeguards which can be put in place to support and protect a repo market.

REPO OF GOVERNMENT SECURITIES

1 Introduction

Repo – the spot sale of an asset coupled with a simultaneous forward purchase of the same asset – has rapidly grown in importance as an instrument in both money markets and securities markets. It is important for central banks to understand the way that repo may affect the behaviour of commercial banks, the interbank market and the potential use of repo by the central bank in its own operations.

In practice, repo is often used as a form of collateralised lending/borrowing, and although legally it involves a transfer of the asset involved, people often talk in terms of “loan”, “collateral” etc. This Handbook uses the more neutral terms “cash provider” and “cash taker” rather than “lender” and “borrower”; but does use the term “collateral” to refer to the asset transferred. Repo is not restricted to the government securities market; but this Handbook refers only to government securities repo.

One of the main benefits of repo over collateralised lending is that, in most jurisdictions, it gives the cash provider better access to the collateral. While securities pledged in a collateralised loan should of course protect the lender against default, obtaining full legal title to the securities in event

of need may involve recourse to the courts, and can be time-consuming, expensive and, potentially, uncertain. With repo, by contrast, the securities belong to the cash provider from the outset, and therefore can normally be sold easily at any stage.

As well as providing better legal title to the securities, repo is usually more flexible than collateralised lending, notably by maintaining liquidity – the “loan” is effectively securitised and so can be on-sold - and by allowing for margining. This flexibility can increase the efficiency of a central bank’s operations in the markets; and by facilitating secured interbank lending, it can be very helpful in the development of interbank markets. Moreover, by increasing the flexibility of government securities, it can increase demand for them and so help to reduce – perhaps only marginally - the costs of government financing. However, there are a number of issues which a central bank and finance ministry need to consider before introducing repo into their government securities market.

2 What is a repo?

A repo is a sale and repurchase agreement: Party A sells securities to Party B with a legally binding agreement to purchase *equivalent* securities from Party B for an agreed price at a specified future date, or at call. Legal ownership to the securities changes – normally via an adjustment in the book-entry depository system - giving Party B full (“unfettered”) title to the securities. Party B may use or dispose of them as it pleases; but it has an obligation to deliver equivalent securities to Party A at the end of the

repo. Party A's spot sale and forward purchase (repo) is matched by Party B's spot purchase and forward sale ("reverse repo").

The interest rate implied by the difference between the sale price and "repurchase" price is the repo rate. If Party A is selling securities to Party B in order to raise finance for itself, then the repo rate is, in effect, the cost to Party A of raising secured funds. Party B can "lend" money to Party A for a "repo rate" of interest, and receive government securities. This is a *general collateral*, or GC, repo (see Figure A), and is normally initiated by the party which wants to borrow money i.e. the cash taker.

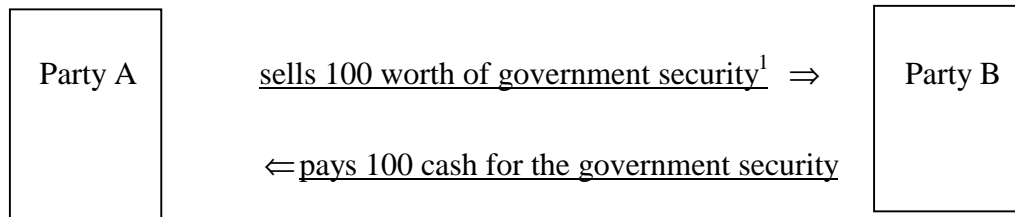
Alternatively, Party B may have a short position in a particular government security, which it covers by obtaining (reversing in, thus "reverse repo") that security from Party A. As Party B is initiating the transaction, A has more negotiating power over the repo rate he will pay on the cash received. The repo rate may therefore be lower (and may even be zero). This allows Party A to invest the cash which it receives – perhaps via GC repo – at a higher rate than he is paying B, and earn a net return. This is a "special" repo, ie a repo in a specific government security (see Figure B), and is normally initiated by the cash provider.

Since the secondary market value of securities provided as "collateral" can vary, the cash taker in GC repo may give a margin to protect the cash provider against adverse movements in the market price of the collateral. For instance, if the expected price volatility of the securities used was V% over the period from initial payment of the margin to its next normal

reevaluation, then a repo loan of 100 would require “collateral” of 100 plus $V\%$ ¹. In developed and liquid markets, the securities are revalued every day².

Figure A: General Collateral Repo (in non-specific stock)

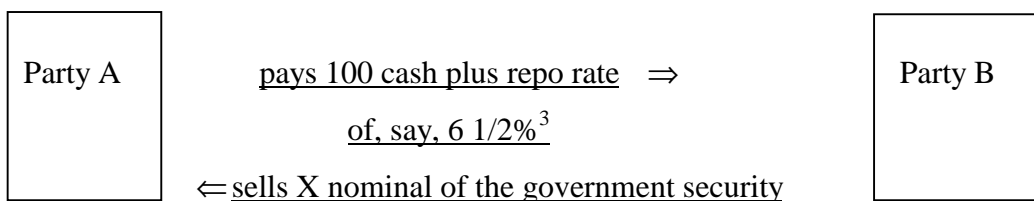
First leg of the GC repo:



¹ with a nominal value of X; or $X/(1-V\%)$ if initial margin is included.

Party A now has 100 of cash, against which it has delivered 100 worth of security to which Party B has full title.

Second leg of the GC repo:



Party B has earned 6 1/2% “interest” on its cash and Party A has paid a lower rate of “interest” for the cash than might have been the case if it had raised unsecured finance.

In less liquid or developed markets, the revaluation may be weekly or less frequent, in which case the initial margin needs to be higher. (Annex 6 details the margining process.)

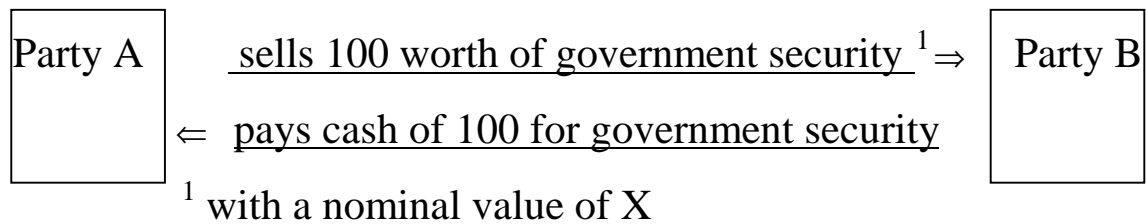
¹ Strictly speaking, the collateral would be $100/(1 - V\%)$; but for low values of V the difference is insignificant.

² Initial margin is not always given in developed wholesale markets where price volatility is relatively low and counterparty creditworthiness deemed to be acceptable.

³ The repo interest is calculated as size of the “loan”*interest rate (here 0.065 as the rate is 6.5%)* period of the repo (e.g. 7/365 for a 7 day repo). $100*0.065*(7/365) = 0.125$.

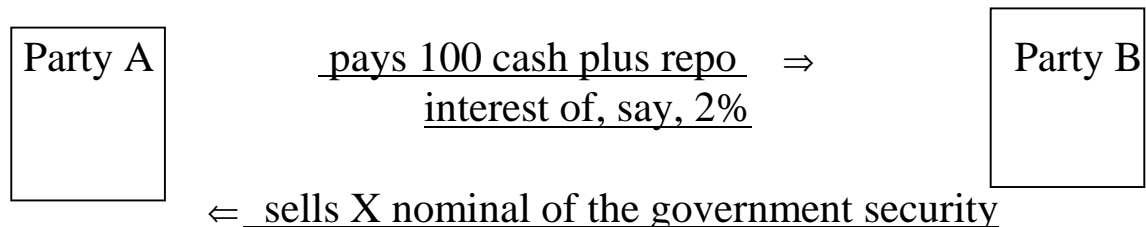
Figure B: Special Repo (in a specific government security

First leg of the special repo



Party B now has 100 worth of government security (to cover its short position) and Party A has the use of 100 of cash.

Second leg of the special repo:



Party A has paid only 2% on the cash received in the repo, but will have earned a higher money market rate on re-investing the cash for the duration of the repo. Party B has foregone part of the interest on its cash in order to cover its short position in the government security.

a) Accrued interest and pricing of the securities

The market value of a security will be affected by accrued interest. In the case of coupon bonds - other things being equal - the market value including accrued interest (the “dirty” price⁴) will increase steadily in between coupon payment dates, and drop by the amount of the coupon on coupon date. In the case of a zero coupon bond, the market value will tend to rise steadily, other things being equal, up to redemption. Similarly, the exposure of a cash lender in a repo transaction will increase over time as interest accrues on the loan.

In the case of most short-term repo transactions, this means that the secondary market value of the collateral increases broadly in line with the value of the loan plus accrued interest. With longer-term transactions, particularly if the yield curve is significantly sloped (whether positively or negatively) the collateral:loan ratio can change over time. This may require a periodic adjustment in the amount of collateral provided⁵.

If a coupon is payable during the life of a repo, there may be a need for a simultaneous adjustment to the level of collateral, as there will be a step adjustment to the market value of the collateral without a corresponding change to the value of the loan plus accrued interest (see annex 7 for an illustration of this point). In practice, most short-term repo

⁴ It is normal market practice to quote securities prices excluding accrued interest (“clean” prices), as this facilitates comparison between different securities and across time; but accrued interest is of course taken into account when calculating the actual payment for any transaction.

⁵ Account must also be taken of ex-dividend dates (if these apply) when valuing the collateral.

transactions will try to use securities where the coupon payment dates fall outside the period of the repo transaction.

b) Hold-in-Custody (HIC) Repo

In some cases, the cash taker may retain the security - in a segregated account - rather than transferring it. For instance, a large bank might borrow cash by repo, but in order to reduce transactions costs and facilitate substitution (see annex 1), the repo is not registered with the (central bank's) government securities registry/depository. While the cash provider is the beneficial owner of the securities, it is still registered in the name of the cash taker. The cash provider takes on some credit risk in order to obtain a higher overall return.

c) Tri-partite Repo

One of the parties in the repo may not have an account in the (dematerialised) settlement system, or may lack the necessary back-office infrastructure to manage the administration of repo. If the cash provider does not wish to assume credit risk on the cash taker by using HIC repo, he could ask a third party - perhaps a custodian bank with good credit rating, or an international clearing organisation - to stand in the middle, effectively acting as an agency broker.

d) **Collateral pooling**

In most markets where the central bank needs to provide liquidity to the market, there will be a number of loans outstanding at any one time. For instance, if the central bank lends daily with a maturity of 10 working days, then at any one time a money market counterparty might have up to 10 different loans outstanding – or more if it makes occasional use of standing facilities as well as open market operations. Pooling of collateral may be the most efficient way to deal with such overlapping loans.

If collateral provided is linked to individual loans, then daily margining will need to be calculated and effected on a loan-by-loan basis. But if collateral is pooled, then one margin calculation and transfer can cover the total value of loans outstanding. In principle, collateral pooling can be used with both repo and collateralised lending, and this is what happens in the UK. A system called “delivery by value” (DBV) can be used, whereby the settlement system computer takes from the securities account of the cash taker the shortest-dated acceptable⁶ securities up to the necessary value (the price risk on short duration securities is lower than on longer-dated). The system treats a term repo as a series of overnight repos,

⁶ In other words, not otherwise pledged, with a maturity longer than the underlying loan, and meeting any other criteria laid down for collateral in central bank operations.

thus taking account of a bank's trading in a flexible manner⁷. This system is widely used by the banking system.

However, in some countries pooling may not be possible legally, whether for repo only, or for both repo and collateralised lending. For instance, the European Central Bank will allow collateral pooling for collateralised lending (“Lombard” lending), but not for repo, reflecting different legal systems across Europe.

3 A Generalised Repo Market

In an open generalised repo market, any market participant is free to undertake government security repo transactions with any other for any purpose (subject of course to vires, supervisory consents etc) either directly or indirectly, through an intermediary. By doing so, it should enhance the liquidity and efficiency of the government securities market⁸. Investors will be able to repo out government securities - as “collateral” - to finance simultaneously their purchases of these same government securities. This is a financing technique which is widely used by

⁷ Treating all outstanding loans as a series of rolling overnight repos has two effects. First, there is no need for margin maintenance, as the system takes securities to the necessary value, using the most recent valuations, every day. Second, any securities which a bank buys, or which become available (e.g. freed from other pledges) will, where appropriate, move into the collateral pool automatically; and securities in the collateral pool can easily be sold – provided that the borrowing bank has other securities with which to replace them.

⁸ This should over time reduce the cost to the government, and to the taxpayer, of debt servicing.

international investors in a number of markets, as it can allow exposure to the (long-term) local interest rate without taking on currency exposure. Additionally, as it increases the emphasis placed on the cost of financing holdings of government securities, it will promote arbitrage between the two markets, leading to greater integration of the money and government securities markets and so creating a more continuous yield curve.

At the least, repo, as essentially a form of secured money, will extend the range of instruments traded in the money markets. In transitional economies, the security afforded by repo may greatly facilitate the development of an interbank market.

How it actually develops will depend on the appetite of private sector market participants for repo trades. The authorities cannot create such an appetite; they can only remove obstacles to a repo market and work with market practitioners on a framework for a safe and orderly market.

4 Restricted Use of Repo

In the UK, government security repo was initially restricted to transactions with the central bank: a generalised repo market in the UK began only on 2 January 1996. Although there was no repo market before that date, repo was used to supplement the normal open market operations at a time of seasonal peaks in liquidity shortage, relieving pressure on the other instruments. Government securities were taken as “collateral”. Participation was initially restricted to a small group of banks and the central bank’s government securities and money market

counterparties (the Gilt-Edged Market Makers - GEMMS - and Discount Houses), and later extended to any bank which signed an appropriate master legal agreement with the central bank. In March 1997 the Bank of England introduced repo as the main instrument for both its daily open market operations and its standing facility. Repo is also used for providing intra-day liquidity to the Real Time Gross Settlement payments system.

In transitional economies considering the introduction of repo, there may be a case for restricting participation in repo initially until the central bank is satisfied that repo “works” in its market, both legally and operationally. This may mean restricting its use to a particular group, such as primary dealers (as in Russia) or restricting the terms of repo (maturity, blocked repo only etc), or both.

For instance, repo could be permitted to anyone who had an account with the dematerialised payments and settlements system, thus effectively restricting the market to wholesale players (on the grounds that those who can afford to run accounts in a wholesale payments and settlements system should be able to look after themselves, whereas retail investors may not have the resources to do so). Or the central bank could allow repo between banks, but not participate itself; or limit the maturity of repo transactions to a relatively short period in the early days of the market. (Since the central bank typically controls the securities payments and settlements system, it is in a position to do so.)

In some instances the central bank may wish to publish a list of those institutions who are eligible to participate in repo transactions.

Blocked Repo

Where repo is essentially being used as a form of secured lending, the securities taken as “collateral” may be put into a blocked account. Although the form of repo means that legal ownership passes to the “cash provider”, they cannot be on-sold or otherwise pledged unless there is an event of default. In this case it is necessary to clarify who has the power to un-block the securities, and in what circumstances. In event of default, it is important that the cash provider can access the securities quickly (to minimize price risk).

Blocked repo reduces the liquidity of the transaction for the cash provider, as it is not possible in this case to on-sell or repo out the securities received. This will tend to discourage the use of longer-term contracts and may prove a major deterrent to the use of repo. In some countries blocked repo is preferred by the authorities, at least in the initial stages of the market, because it prevents a chain of transactions involving a single security, and where a default could precipitate a chain-reaction. (If Bank A does not return securities to Bank B, then Bank B cannot in turn pass them back to Bank C, and so on.)

Blocked repo also prevents the cash provider from taking a short position by selling outright a security which has been repoed in. However, it is not clear that this reduces risk in the market, since any position, whether long or short, entails a measure of risk. In some markets –

such as Hong Kong – dealers can take a short position in individual securities provided their overall portfolio position is long.

Repo operations by a central bank

When describing their operations, central banks often talk from the viewpoint of the market. For instance, a “shortage” normally means that the commercial banks have a shortage of liquidity (central bank balances). The shortage may be covered by repo operations, where the commercial banks repo securities to the central bank. Although from the point of view of the central bank, this is a reverse repo, central banks nevertheless tend to describe such transactions as repo operations. In some countries the settlement system automatically selects which securities to take from a bank’s portfolio, perhaps using an algorithm which chooses those with the shortest residual maturity and the largest outstanding volume (since these tend to be the easiest to price accurately and the most price-stable); although the cash-taker can normally override the automatic selection and offer other suitable securities.

It is important that the central bank offer the standard substitution facility (described in annex 1) in such circumstances, particularly when monetary operations and debt management functions are handled separately. Otherwise the central bank may find itself holding a large volume of the more liquid short-dated securities, and in effect reduce the market liquidity of those securities. In principle, a central bank could repo

out a security to take advantage of, or offset, times when that security has gone special, but this would risk the central bank being seen as taking advantage of the market situation, over which it may have considerable influence, to extract profits for itself. A central bank's operations in the securities market are not normally profit-oriented. Rather, the cash taker could be allowed to substitute the 'special' security; or perhaps the debt manager⁹ could take action in the securities market.

Repo and reverse repo can also be used to facilitate government cash management – as distinct from debt management. A government could handle its short term cash management needs – whether it has a cash shortfall or a surplus – by using interbank transactions (depositing with or borrowing from commercial banks), or in the case of a shortfall by issuing very short-term cash management bills. But it may be easier to obtain a good market price – and thus in general be cheaper – to use an existing repo market, where the government's cash management requirements are unlikely to dominate the market.

5 Market Structure and Supervision

In an open, generalised repo market, there is no need for an approved list of those who may undertake government security repo transactions; it is for each market participant to choose its counterparties. Similarly, any group is free to offer intermediation services in government security

⁹ Whether a separate Debt Management Agency or a separate department of the central bank.

repos, on an agency or matched-principal basis. But the central bank may take the view that repo services should only be provided by those authorised to do so, and supervised by the central bank (or another appropriate supervisory agency). In such a case, a list of authorised intermediaries could be published. For instance, in the same way as a primary dealer system can be used in the money market or government securities markets, a repo dealer system could be used (France has done this), where a small group of institutions undertakes an obligation to make a two way market in repo, in return for certain privileges (such as a repo dealing relationship with the central bank).

The introduction of government security repo inevitably involves new trading practices and, for some firms, new types of transactions. The central bank may therefore wish to address beforehand with the market a series of measures designed to promote a safe and orderly market. In the UK, the Financial Services Act provides a framework for the regulation of conduct of business and investor protection. Government security repo transactions will also fall within the definition of “financial instruments” for the purposes of the European Union’s Investment Services Directive and Capital Adequacy Directive, so government security repo trading will be subject to the requirements of the respective regulatory authorities that implement these directives.

Where new measures are desirable, the central bank's role may be essentially catalytic, bringing together practitioners from various parts of the market to draw up and promote a standard legal agreement, a code of best practice and, where possible, standard settlement practices.

a) Legal documentation

Legal documentation (normally based on the PSA/ISMA Global Master Repurchase Agreement¹⁰) may be developed for use in the government securities repo market. The use of a proper legal agreement is of paramount importance. The central bank should strongly urge all market participants not to enter into any repo or repo-like transactions unless there is sound legal documentation covering amongst other things marking to market, margining and close-out netting in the event of default. Some participants enter into undocumented sell/buy back transactions where a spot sale and forward purchase are undertaken as linked transactions, but with no protection against market price movements and counterparty default; the Bank of England regards this as imprudent (see annex 1 on main distinctions between repo and sell & buy-back; and annex 2 on legal agreements).

¹⁰ The PSA/ISMA Agreement was drawn up under the auspices of the Public Securities Authority (now the Bond Dealers Association) and the International Securities Market Association. The Agreement is widely used in existing repo markets and is thus already familiar to many investors. An annex to the PSA/ISMA Agreement can cover points specific to the domestic government security market.

In some emerging markets, transactions labelled as repo are actually sell and buy-back, or even simply collateralised loans. Such transactions do not necessarily offer the “safety features” of true repo.

b) Code of Best Practice

In the UK, the industry-produced Code of Best Practice, which complements the Gilt Repo Legal Agreement, endorses the best practice that has already developed over time in other repo markets, and in London’s existing government security market. The Code has been recognised as a statement of best practice by the Financial Services Authority (FSA) and trade associations. Importantly, the Code Working Party will remain in existence as a standing body, and will keep its provisions under review as the government security repo market develops (see annex 3).

c) Settlement

The central bank and market participants will also need to consider a range of technical settlement and systems issues, such as whether to standardise various back office procedures relating to government security repos and how repo transactions should be handled in the central bank’s government securities payments and settlements system. This may require, for instance, an increase in hardware capacity and in the system’s operational timetable.

Where possible, settlement practices and related conventions for government security repo transactions should conform both to existing government security market and repo market practices. Where there are differences, the process of consultation could either lead to consensus either on what approach to adopt or, on certain points of detail, that the matter should be for counterparties to agree bilaterally.

d) Monitoring the Market

The central bank often supervises institutions, rather than markets, and may not supervise the government security repo market as such. It will, however, wish to monitor the size, growth and orderliness of the repo market, as well as its interaction with other markets. Day-to-day monitoring, both from the central bank's dealing room and via liaison with market participants, will focus on market rates and trading patterns. Beyond that, the central bank may aim to collect data, essentially on levels of activity, from the main repo market players; and to publish this in aggregated form.

6 Accounting issues

It is common for accounting for repo to reflect the “economic” rather than the legal nature of the transaction. Since repo is most frequently used as a means of secured lending/borrowing, it makes sense to account for it in a similar way.

In the case of the cash taker (“borrower”), repo leads to an expansion of the balance sheet. Consider a bank with deposits of 100 and bonds worth 100, which then “borrows” 100 on repo. Following International Accounting Standards (IAS), the balance sheet changes as follows:

<i>Before</i>	liabilities		assets	
	deposits	100	bonds	100
<i>After</i>	liabilities		assets	
	deposits	100	bonds ¹	100
	“loan”	100	cash	100
			¹ Footnote: the bonds have been repo’ed out as security against the loan of 100	

Such an expansion of the balance sheet might lead to an increase in the level of required reserves where the cash taker is a bank; although if the cash provider is another bank, the “loan” may be classified as an

interbank transaction¹¹. The central bank needs to be careful that this does not make repo artificially expensive and so discourage its use as a form of secured transactions. The European Central Bank (ECB) has decided to exclude liabilities arising from repo transactions when calculating reserve requirements.

In the case of the cash provider, repo does not lead to an expansion of the balance sheet. The asset side is switched from “cash” to “loan”, and a footnote to the accounts will show the future requirement to complete the second leg of the repo when the “loan” is unwound.

This means that the balance sheets of banks involved in repo transactions, and the entries in the government securities registry/depository, will not be the same. The cash taker keeps the bond on balance sheet even though it has moved in the depository to the cash provider’s account; and the cash provider shows a loan on its balance sheet, rather than a bond, even though it legally owns the bond. The extracts from the Bank of England’s 1998 accounts at annex 8 provide an illustration of this.

If the cash provider sells the bill/bond before the second leg of the repo, then it will have a cash entry in its assets; but the “loan” to the cash taker in the repo transaction still exists, and there is no additional liability. The cash provider consequently has to show a negative bond asset. If a bank with a “long” position in securities – say a bond asset of 100 – sells the bond, the asset entry is reduced by 100. Similarly, if a bank with a flat

¹¹ Interbank loans are not usually subject to reserve requirements

securities position sells bonds worth 100 – securities which have been repo'ed in and are available for sale even though they are not on balance sheet – then the flat (ie zero) securities position is, likewise, reduced by 100 – in this case to minus 100.

This treatment means that the balance sheet gives an accurate picture of the two banks' position. The cash taker is still exposed to movements in the bond's price even though it is not, temporarily, the legal owner. By the same token, the cash provider is not exposed to movements in the bond price while it has a flat position (ie while it is holding the security as collateral), and it would therefore be misleading to imply in the balance sheet that it did have assets linked to bond prices. If it on-sells the security, taking a “short” position, it is exposed to bond price movements; but in the opposite way to the first bank. If prices fall, it can repurchase the security for less than it sold it, thereby returning to a flat position and making a profit.

7 Statistical treatment

In international statistical methodology the intention is to distinguish repos by their nature: if ownership of the underlying security does not change hands, then a collateralised loan should be recorded; if ownership of the underlying security changes hands, then a sale and purchase of securities should be recorded. However, in some instances it is accepted that because of legal, institutional and other considerations, national

compilers may be required to adopt an alternative treatment. They may have no realistic choice other than to require data to be reported in line with the prevailing accounting and/or regulatory conventions. Consequently among countries with the largest markets, including the UK, repos, where ownership changes hands, are more commonly treated as collateralised loans.

Given the growth of repo markets in recent years, it is important to realise that the type of reporting methodology employed can significantly affect published economic data. For instance, consider the case of a non-resident purchasing a domestic security and financing this purchase through a repo transaction conducted with a resident. The repo transaction involves the same security and ownership changes hands. If the repo transaction is treated as a collateralised loan, then the balance of payments and position statement records a purchase of domestic securities by a non-resident – increased liabilities - and increased lending to non-residents – increased assets. On the other hand, if the repo transaction is treated as a security sale, then the initial purchase of the domestic security is matched by a subsequent sale, so that the non-resident exposure to the domestic securities market is not captured.

The reporting treatment becomes more complex if repo transactions are treated as collateralised loans and the security delivered under the repo is subsequently on-sold. In these circumstances, both the original non-resident purchaser of the security and the ultimate purchaser will record

owning the same security. In the UK this issue is addressed by the seller of a security acquired under a repo transaction recording a negative – or short – position in that security, leaving only one “net” owner.

8 Tax issues

In the UK, most investors – whether resident or non-resident - can receive gross dividends, so that withholding tax should not be applied to dividend payments on most government security holdings. Manufactured dividends - made by one party to another to compensate for the loss of a direct payment of dividend during a government security repo transaction - will be payable gross in all circumstances. This will mean that all counterparties in a repo will be able to manufacture gross dividend payments; most will also be receiving gross dividends.

Any country introducing repo will need to consider whether existing tax arrangements will facilitate or obstruct the development of a repo market. In particular, turnover or sales tax may be deemed to apply to repo transactions, thus introducing a tax distortion between repo and collateralised loans, particularly short-term transactions (sales tax may make short-term repo unprofitable). If possible, such tax distortions should be removed¹².

¹² This sort of tax does not bring in revenue; it simply prevents repo transactions.

Classic repo vs Sell and Buy-Back

A sell and buy-back is in many respects similar to a repo, though more “primitive”. The key similarities and differences, summarised below, are:

- **Purchase and Sale:** Both involve purchase and sale, ie transfer of ownership, rather than the use of the security as collateral (where ownership is only transferred in the event of default).
- **Margin maintenance:** Sale and buy-back typically does not involve margin maintenance. While this simplifies the transaction, because there is no need to provide additional margin if the secondary market price of the security changes, it can give rise to increased credit risk – see annex 6.
- **Coupon:** With repo, the cash taker retains the right to any coupon payments. If a coupon is paid during the life of the repo (to the cash provider as legal owner), it must be immediately passed to the cash taker. Failure to do so would constitute an event of default. In a sell and buy-back, the value of the coupon is factored in to the re-purchase price. This gives rise to credit exposure against the cash provider for the period between payment of the coupon and maturity of the repo.
- **Substitution:** In a repo transaction, the security repoed can in principle be substituted for another security of the same value. Assume for instance that a market-maker repos out a security, and then has demand from a client to buy that particular security. The market-maker could conclude the deal with the client, and substitute a different security for the one repoed. The client obtains the specific security he wants, and the repo cash provider still has satisfactory “collateral”. (In practice, the cash provider may charge a few basis points for the

inclusion of the substitution clause, since this gives the cash taker rather than the cash provider the chance to benefit if the security goes “special”.) There is no right of substitution in sell and buy-back transactions.

- **Industry-approved contract:** This exists for repo, normally the PSA/ISMA contract, providing greater legal certainty to both participants. There is no standard documentation with sell and buy-back transactions.

CLASSIC REPO vs SELL/BUY-BACK

	Repo	Sell/Buy-Back
Purchase and Sale	✓	✓
Margin Maintenance	✓	
Coupon passed	✓	
Coupon added to end price		✓
Substitution	✓	
Industry-approved contract	✓	

The Key Elements of a Master Repo Legal Agreement

The key elements of a government security repo/legal agreement are:

- It comprises the PSA/ISMA Global Master Repurchase Agreement for gross-paying securities together with supplemental terms and conditions which fit the characteristics of repos in the local market.
- It aims to provide absolute transfer of title of the securities being repoed.
- It provides for re-margining during the life a repo contract, or for a contract to be closed out and re-priced. It also provides for close-out and set-off in the event of default.
- All transactions undertaken with a single counterparty under the PSA/ISMA Agreement with appropriate annexes (such as that for gilts) may be closed out and set off in the event of default by that counterparty.
- The legal agreement covers agency transactions where one of the parties acts as agent, on behalf of a named principal.
- Users of the legal agreement will be free to extend its provisions to cover further points specific to their needs, although they will need the agreement of their counterparties, and should obtain legal advice.

The Code of Practice – key elements

- Before entering into repo transactions, and regularly thereafter, participants should review all legal, credit, systems and procedural matters relating to the local repo market to ensure that trading is adequately controlled and understood.
- New clients should be made aware of the Code. Particular consideration needs to be given to the effectiveness of any legal agreement proposed with non-residents.
- Repo transactions should be subject to a legal agreement between the two participants concerned. The market standard is strongly recommended (subject to legal confirmation that it is appropriate for the transactions intended).
- Margin should be called whenever a counterparty has a mark-to-market valuation exposure that they consider material.
- Taking delivery of securities and margin directly or via a third party can reduce potential credit risk. Those considering leaving securities purchased in the custody of their counterparty (“HIC” repo) should consider very carefully their counterparty’s creditworthiness, systems and control procedures, etc.
- Special consideration should be given to ‘government security events’ such as dividend dates, conversion options etc occurring during the life of the repo.
- Confirmations should be sent out and checked on a timely basis. The Code should ideally be recognised by regulators, exchanges, and market associations.

Repo Settlement

The settlement timetable may need to be extended at both the start and end of the day to accommodate increased volumes and help back offices cope with them.	Open – no fixed maturity - repos should be terminated and the securities returned the same day if they are called before an agreed cut-off time (say, 10.00am), unless the counterparties have agreed otherwise.
More accurate and timely reference prices may need to be made available for market participants	The practice of call-over should be extended to cover all repo transactions, other than same-day trades. Call-over entails the deliverer of government securities calling their counterparty to confirm delivery of the securities.
Coupon entitlement should reflect value date (settlement date) rather than trade date.	It is recommended that confirmations be sent and delivered same-day, to ensure compliance with the Code of Best Practice
Where a repo spans a dividend (or an ex-dividend ¹³) period, the forthcoming dividend payment should be factored into the calculation of margin.	Market participants cannot be forced to accept partial deliveries, but many participants will wish to “shape” large trades into smaller trades and also to accept partial deliveries.

¹³ In some countries the time lag between transactions in securities and registration of the change of ownership means that trades conducted a few days before a coupon payment date will not be registered before the coupon payment is initiated. This means that the old holder will receive the coupon, rather than the new. After the cut-off date (the “ex dividend” date), such securities trade “ex [without] dividend”.

Monitoring the market

The central bank will almost certainly wish to monitor government security repo activity closely, in support of any operational responsibilities for financing of the government and in order to provide information on the development of the markets.

Repo activity undertaken by the central bank's market counterparties or banks generally can be covered by routine statistical returns and at supervisory and operational meetings

The central bank's government securities and money market desk can monitor rates and day-to-day activity in the market, including through screens and through direct lines to active repo participants.

In addition, the central bank may seek periodic (eg. quarterly) data from active repo market participants. Aggregate data could be published periodically, covering:

- the value of repo contracts entered into during the period, broken down by original maturity;
- the total number of deal tickets written during the period.
- the value of repo transactions outstanding at the end of the period, broken down by residual maturity.

This information should be requested for repo and could include buy/sell transactions undertaken under appropriate documentation

Margining

The cash provider will own the securities throughout the life of the repo and, in order to ensure adequate collateralisation, will take daily margin if the value of the securities falls. Assume Party A repos to Party B, receiving 100 cash for 30 days; and that on day 1 the security is valued at par (i.e. its secondary market value is the same as its face value). Imagine the price falls over the next few days as indicated in the table. In this example, if no margin was taken, then when A goes bankrupt, B will not have sufficient collateral to cover himself.

Day	Price	Event	Margin = 2.5%		
			Collateral value start day	<i>end day</i>	Nominal end day
1	100	First leg of repo	102.6	<i>102.6</i>	102.6
2	99.8		102.4	<i>102.6</i>	102.8
3	100		102.8	<i>102.6</i>	102.6
4	100		102.6	<i>102.6</i>	102.6
5	98	Price falls o/a bad economic news	100.5	<i>102.6</i>	104.7
6	98		102.6	<i>102.6</i>	104.7
7	98		102.6	<i>102.6</i>	104.7
8	95	rumours about A	99.4	<i>102.6</i>	108.0
9	95		102.6	<i>102.6</i>	108.0
10	95		102.6	<i>102.6</i>	108.0
11	95		102.6	<i>102.6</i>	108.0
12	93	A announces bankruptcy	100.4	<i>102.6</i>	110.3
13	93	B sells securities	101.5	<i>102.6</i>	111.5

If B had taken initial margin to protect against expected daily price fluctuations, and in addition had taken variation margin each day, then he would have been better protected in the case of a default by A. The precise position would be course depend on the size of margin taken. If expected daily volatility was 2.5%, so that the initial value of securities provided was 102.6 (= 100/0.975); and if variation margin kept the level at 2.5%, the value of the securities at the start of each day would be as indicated in the fourth column. Provided A transfers variation margin on day 8, B does not lose money in the event of a default (if A did not do so, this failure would constitute an event of default). A margin level of just over 3% would be necessary to have given B full protection throughout.

In developed markets it is common practice for wholesale market participants not to give or take *initial* margin, but *variation* margin is used to prevent either party taking a credit exposure against the other. In repo, either party may be exposed to the other. As illustrated above, if the security value falls, the cash lender is exposed. But if the security value rises, the cash taker may be exposed to the cash provider: if the latter on-sells the security and then defaults, the cash borrower may lose the profit expected from the security's gain in value¹⁴. In wholesale market transactions where both parties to the transaction are of a similar credit standing, it is not obvious that one side rather than the other should

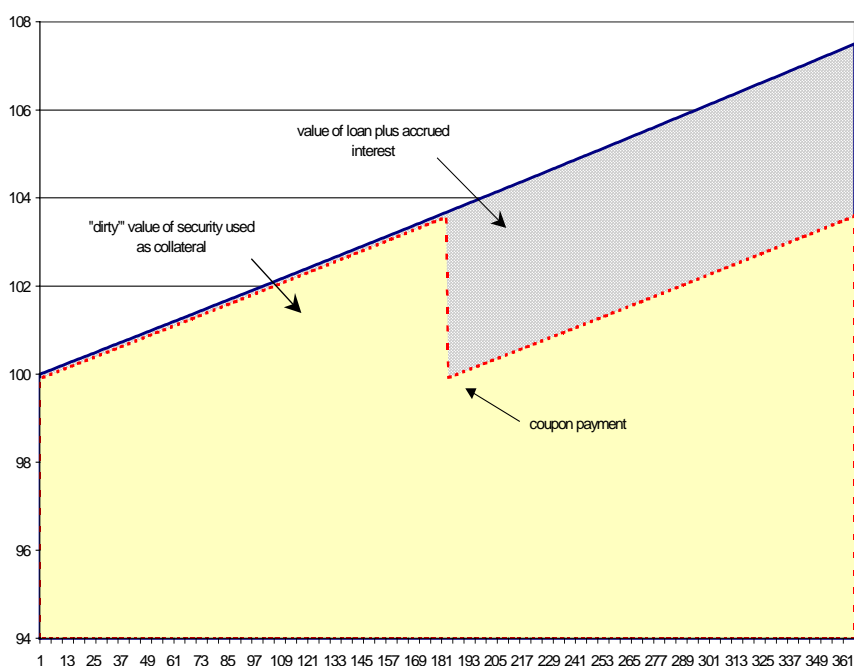
¹⁴ By contrast, in the case of a collateralised loan, the cash lender cannot on-sell the security, and the borrower will not therefore be exposed to the lender.

provide initial margin. (If the central bank is lending to the commercial banks via repo, its credit standing is clearly better than that of the borrowers, and it is therefore reasonable for the central bank to demand initial margin.) Variation margin will ensure that neither side becomes exposed to the other when prices move.

By contrast, in some developing markets daily/variation margin is not taken – either because of technical problems or of market revaluation difficulties. In such cases the initial margin is normally taken, and can be quite high – sometimes 20-25% or more – to cover revaluation risk.

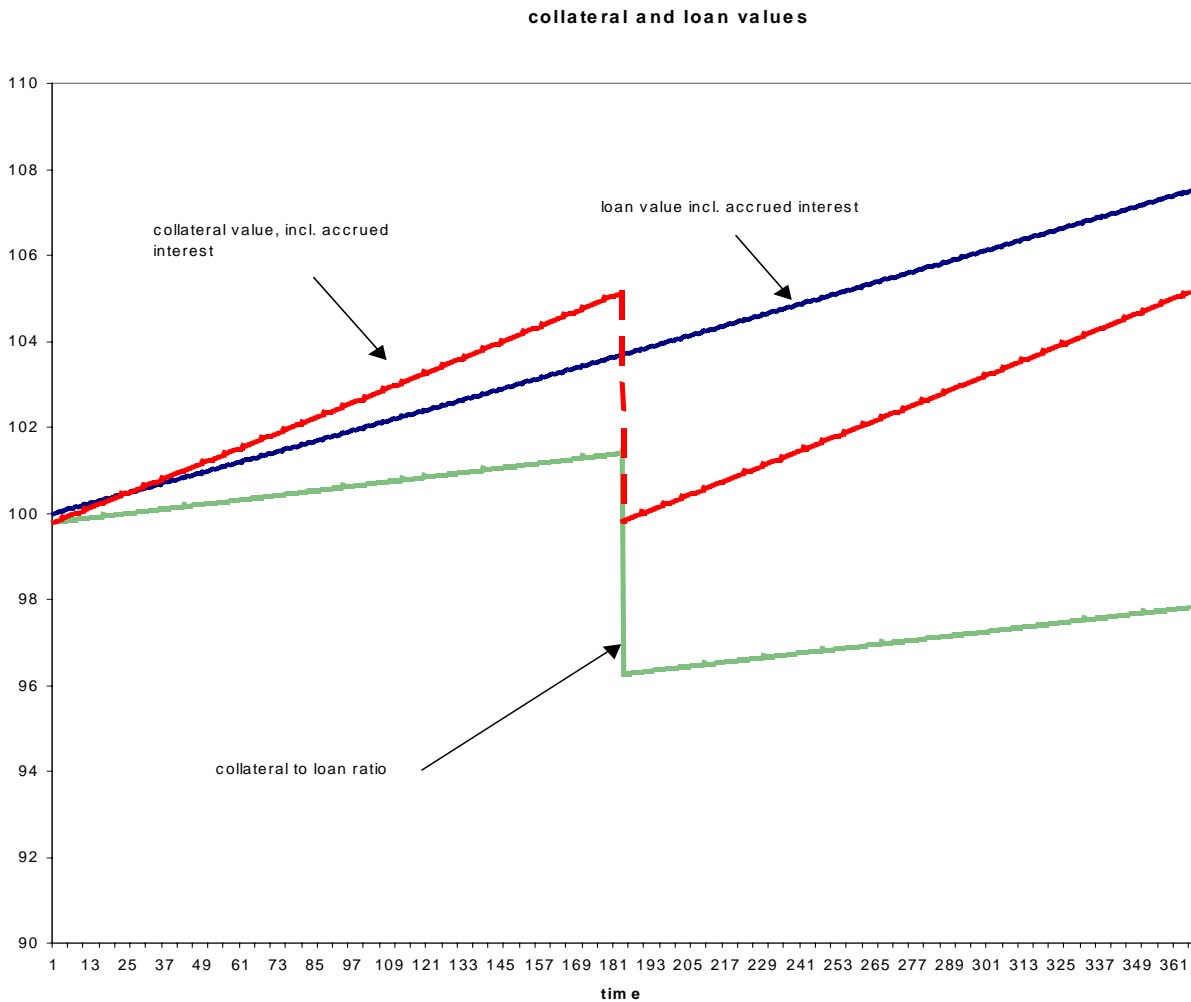
Collateral Pricing

The chart below illustrates the relationship between the market value of collateral, including accrued interest, and the repo loan, also including accrued interest. In this example, for simplicity, there is no margin (initial or variation); and the repo rate, and both coupon and yield on the security are all the same (7.5%).



In this case, payment of appropriate variation margin on coupon payment date would ensure that the collateral:loan ratio was maintained until the end of the repo transaction. In reality, it is unlikely that the repo

rate, bond coupon and bond yield will all coincide: the margin would therefore need to be varied more often to ensure that appropriate margin is maintained. The example below uses a repo rate of 7.5% but a coupon and bond yield of 11%; the line shows the change in the collateral:loan ratio.



Further Reading

Bank of England: Gilt Repo Code of Best Practice (August 1998)

The Development of an Open Gilt Repo Market (November 1994)

Plans for the Open Gilt Repo Market (March 1995)

“The First Year of the Gilt Repo Market “ (QB, May 1997)

ISMA (International Securities Market Association): “Global Master Repurchase Agreement” (November 1995) [Rigistrasse 60, PO Box, CH-8033Zurich, Switzerland]

Handbooks in this series

<u>No</u>	<u>Title</u>	<u>Author</u>
1	Introduction to monetary policy	Glenn Hoggarth
2	The choice of exchange rate regime	Tony Latter
3	Economic analysis in a central bank: models versus judgment	Lionel Price
4	Internal audit in a central bank	Christopher Scott
5	The management of government debt	Simon Gray
6	Primary dealers in government securities markets	Robin McConnachie
7	Basic principles of banking supervision	Derrick Ware
8	Payment systems	David Sheppard
9	Deposit insurance	Ronald MacDonald
10	Introduction to monetary operations	Simon Gray and Glenn Hoggarth
11	Government securities: primary issuance	Simon Gray
12	Causes and management of banking crises	Tony Latter
13	The retail market for government debt	Robin McConnachie
14	Capital flows	Glenn Hoggarth and Gabriel Sterne
15	Consolidated supervision of banks	Ronald MacDonald
16	Repo of government securities	Simon Gray

The text of the Handbooks can be found on the Bank of England's web site
"www.bankofengland.co.uk"

When government central banks repurchase securities from private banks, they do so at a discounted rate, known as the repo rate. Like prime rates, repo rates are set by central banks. The repo rate system allows governments to control the money supply within economies by increasing or decreasing available funds. A decrease in repo rates encourages banks to sell securities back to the government in return for cash. This increases the money supply available to the general economy. Conversely, by increasing repo rates, central banks can effectively decrease the money supply by discouraging banks. Repos are typically short-term transactions—usually overnight—but they can extend out as far as two years. They enable broker/dealers, banks and other market participants to sell securities in order to obtain immediate funds for their own accounts, or for the benefit of their clients. DTCC's Fixed Income Clearing Corporation (FICC), through its Government Securities Division (GSD), matches and nets repo transactions as part of its netting process for other government securities trading activity, including all buy/sell transactions and U.S. Treasury auction purchases. Since the Repurchase Agreements Service was introduced in 1995, it has rapidly outpaced all other products and accounts for the largest dollar volume of U.S. Government securities trades processed through FICC. Examining the resiliency of repo and securities settlement during COVID-19. All Insights. The Pandemic Stress Test: US Government Securities Clearance & Repo. August 2020. By Brian Ruane. The volatility of March 2020 represented the most serious test for US capital markets since the 2008 global financial crisis. In our capacity as a leading agent in triparty repo and US government securities clearance, BNY Mellon was at the center of these events, occupying a unique vantage point amid one of the most extraordinary periods in recent financial history. In The Pandemic Stress Test, we share data from our Clearance & Collateral Management business which provides new insight into how US repo markets performed through the volatility.