

WORLD 2 / CHAPTER 5

REAL SALE AND REPURCHASE AGREEMENTS

	Page
1. Repos / reverse repos	3
2. Classic repo / US-style repo	4
3. Buy-and-sell-back	11
4. Security Lending	16
5. Economic background of sale and repurchase agreements	17

REAL SALE AND REPURCHASE AGREEMENTS

Real sale and repurchase agreements

Real sale and repurchase agreements (repos) are contracts with which a financial institution or one of its customers (pledgor, borrower) transfers his assets to another financial institution or another customer (pledgee, lender) in exchange for an amount of money. Simultaneously, they agree that in the future (on an agreed date) the assets will be transferred back to the pledgor in exchange for the payment of either the received amount of money or of an amount that has been agreed on.

The market makes a distinction between two products: Repos/reverse repos and sell-and-buy-back transactions.

1. Repos / reverse repos

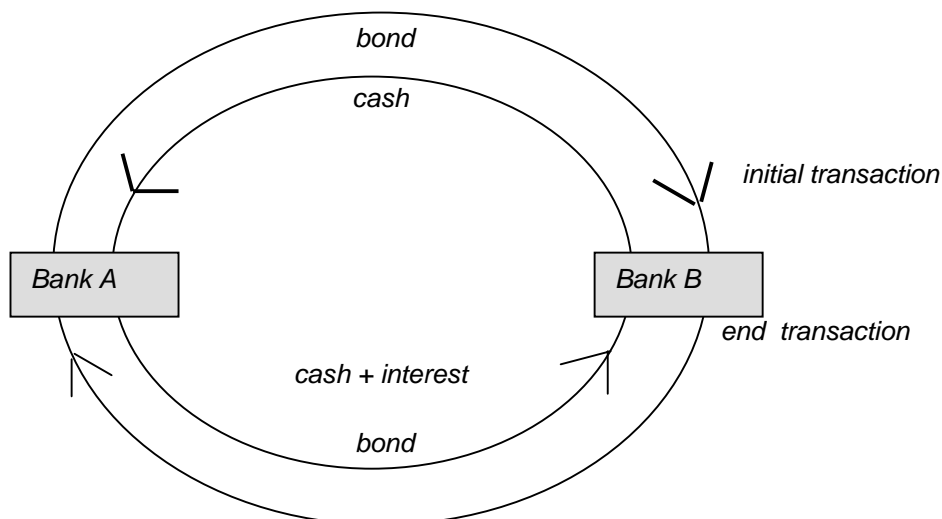
Repo is short for a sale and repurchase agreement. The parties agree on the simultaneous purchase/sale of a security and the sale/purchase of the same security at a later date at a fixed price.

In a repo, the transfer of securities is matched by a cash transfer. This way, the security is borrowed by one party and the cash by the other for exactly the same term. All repos are structured so that the economic benefits and risks of owning the securities remain with their original owner.

For the lenders of cash, a repo has the advantage of an additional security if the counterparty defaults. This way, cash will be lent with a lower margin which in turn offers the counterparty the possibility to borrow money more cheaply.

A repo is the sale of the security at T_0 and the repurchase at a later date. The bond is delivered against cash at T_0 . At the subsequent repurchase the cash is paid back plus interest.

A reverse repo is the opposite – an initial purchase of securities followed by a subsequent resale.



From bank A's point of view this operation is a repo.

From bank B's point of view this operation is a reverse repo.

2. Classic repo / US-style repo

A repo (repurchase agreement) is the sale of a bond against cash with the simultaneous obligation to buy back the bond at a later date at a given price. An important point about a classic repo is that both legs of the repo are transacted under one agreement.

Legal framework

Legal title to the collateral passes for the term of the repo to the buyer of the repo. The effect of this is that if the seller defaults on the cash payment, the buyer does not need to establish his right for the collateral since he is legal owner of it.

In the USA, the basis for repo contracts is the PSA agreement whereas in Europe the PSA/ISMA General Master Repo Agreement (GMRA) is increasingly used.

Coupon payments

Coupon payable during the repo term is received by the buyer of the bond, i.e. who buys the bond in the repo. The repo agreements though state that the coupon must be transferred from the buyer to the seller on the same date as the buyer receives the coupon. The practice to transfer coupon payments is called “manufactured dividend”.

Price calculation / Terminology

Repos are quoted on a p.a. basis. The repo interest rate is calculated according to the relevant money market convention. The repo terminology, however, is based on the securities side of the deal. The buyer of the repo is the party that purchases the bond in the first leg, the seller is the party that borrows the cash. According to this convention the bid rate is higher than the offer rate.

The market maker buys the bond at the bid rate (i.e. he lends money at the higher side of the quote) and sells it at the offer rate (i.e. borrows money on the lower side of the quote).

Example

You are quoted the following repo rates: 3.30 – 3.25 %

You can sell the bond at the offer rate and pay 3.30 % for the borrowed cash.
 You can buy the bond at the offer rate and receive 3.25 % for the money lent.
 Repos are usually quoted on an interest rate basis. However, the prices for the initial and final security transactions are fixed.

For the initial transaction, the dirty price of a bond is used.

For the final transaction, the price of the initial transaction compounded by the repo rate is used.

Example

Bank A carries out a repo-transaction with the following specifications:

bond security:	10 Mio bond, 6 %, term until 10th of March 2005, 153 days of accrued interest
current market price:	101.50 + accrued interest 2.55 = 104.05 (dirty price)
repo rate	3 %
term:	30 days

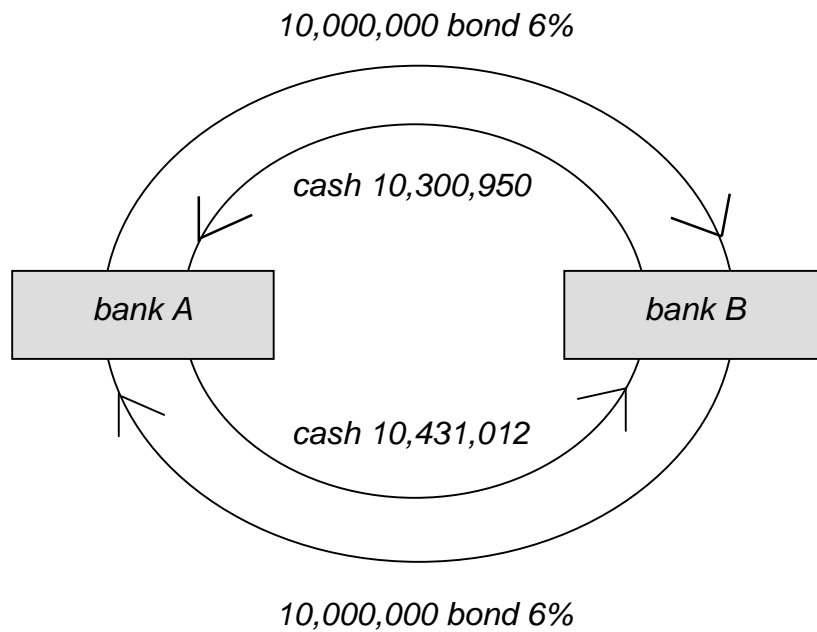
Initial transaction: 10,000,000 bond 6 %

$$10,405,000 \text{ cash } \left(10,000,000 \cdot \frac{104.05}{100} \right)$$

Final transaction:

$$10,431,012 \text{ cash} \left(10,405,000 \cdot \left(1 + 0.03 \cdot \frac{30}{360} \right) \right)$$

10,000,000 bond 6 %



General Collateral / Special

Usually repo deals are driven by the wish to invest or borrow money. The exact specifications of the collateral do not play an important role as long as an adequate quality is delivered. Since government bonds are most commonly used in repo deals, this is no problem. If the buyer of the bond does not ask for a specific collateral it is a general collateral.

If the buyer is short a specific bond he may want to purchase this specific bond in a repo. In this case, when the collateral is exactly defined, the bond is called a special.

Since in a special the collateral is particularly requested by the buyer, the seller can negotiate a higher price, i.e. a lower repo rate for the borrowed cash than for a general collateral.

Terms

Generally, repos are very short-term. Terms range from one day (overnight) to few months. If the term is exactly specified, the repo is called a term repo. An open repo has no fixed maturity and can be terminated by either party at any time.

Margins

Since the value of the collateral can change during the term of the repo the bond may no longer suffice as proper security for the money lent. In order to ensure that the value of the collateral is at least equal to the cash lent, margins are calculated.

There are initial margins and margin calls. An initial margin or haircut protects the buyer of the bond against adverse movements which may arise before a margin call can be paid.

Calculation of haircut

- Fixed nominal

$$\text{Volume of initial transaction} = \frac{\text{nominal price} \cdot \frac{\text{dirty price}}{100}}{1 + \text{haircut}}$$

- With fixed cash transaction

$$\text{Nominal of initial transaction} = \frac{\text{cash}}{\frac{\text{dirty price}}{100}} \cdot (1 + \text{haircut})$$

Example

Dirty price: 103
 Haircut: 2 %
 Nominal: 10,000,000

- Fixed nominal

$$\text{Volume of initial transaction} = \frac{10,000,000 \cdot \frac{103}{100}}{1 + 0,02} = 10,098,039$$

- Fixed cash amount (10,000,000)

$$\text{Nominal of initial transaction} = \frac{10,000,000}{\frac{103}{100}} \cdot (1 + 0,02) = 9,902,912$$

Margin calls are made to keep the value of the collateral in line with the value of the cash loan. If the value of the collateral rises (falls), the buyer (seller) must put up more collateral (money) as margin. The current value is always calculated with the dirty price, i.e. including accrued interest.

The haircut as well as the margin calls (marking to market) can be provided in cash or security. Because bond prices are constantly changing, the two parties usually agree on a threshold below which changes in the collateral's value do not trigger a margin call.

At the end, we want to introduce some special repo agreements:

- **Substitution**

Substitution is the right for the seller to substitute one security for another (with similar quality) as collateral during the term of the repo. Substitution is only possible for general collateral.

- **Triparty Repo**

If the seller does not deliver the collateral directly to the buyer but to a third party and that third party holds it in a separate account on the buyer's behalf, the deal is called a triparty repo. The main rationale behind this construction is to contract out the administrative and legal costs to a specialized institute.

- **Dollar Repo**

A dollar repo is a repo in which the buyer may return at maturity a security which is different, within agreed limits, from the original collateral.

- **Forward Start Repo**

This is a repo where the start date is for value later than the normal settlement date for the security concerned.

- **Floating rate Repo**

In a floating rate repo, the repo rate is re-set at pre-determined intervals according to some benchmark, such as LIBOR.

- **Reverse to maturity Repo**

This is a reverse repo with the same maturity date as the security used as collateral.

3. Buy-and-sell-back

A buy-and-sell-back repo is an agreement to change securities against cash today and to transfer the securities back at a specified date and price. Contrary to classic repos, both deals, though done simultaneously, are treated as two separate legal entities.

Coupon payments

Coupon payable during the repo term is received by the buyer of the bond, i.e. who buys the bond in the repo. Contrary to the classic repo, the coupon is not immediately transferred to the seller but paid back at the end of the repo term, compounded by the repo rate.

Price calculation / Terminology

Buy-and-sell-back are quoted on a p.a. interest rate basis. The terminology is also based on the securities side, thus the bid rate is higher than the offer rate, because the buyer buys the bond at the offer rate (the interest rate he receives for the cash) and vice versa.

Buy-and-sell back agreements determine the price for initial and forward transaction. The prices mirror the quoted interest rates.

Initial and forward transaction are calculated like in a classic repo.

The price of the initial transaction is the market price (dirty price) of the bond. The price of the forward transaction is the volume of the forward transaction divided by the nominal (= dirty price).

Price of initial transaction: dirty price

Volume of initial transaction: $\frac{\text{dirty price}}{100} \bullet \text{nominal}$

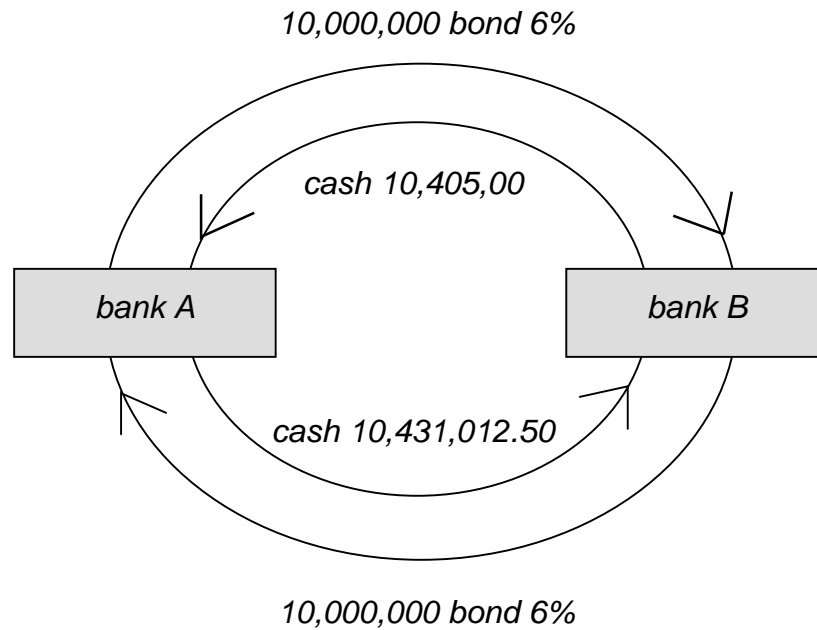
Dirty price of forward transaction: (volume forward transaction/nominal) * 100

Clean price forward transaction: dirty price – accrued interest

Volume of forward transaction: volume initial transaction*(1+ repo rate *days/basis)

Example

A dealer sells 10 Mio government bonds, coupon 6 %, within a sell-and-buy-back transaction for a term of 30 days. At the time of the initial transaction, the bonds have an accrued interest for 153 days and a current market price of 101.50. The stipulated interest rate is 3 %.



Price of initial transaction: 101.5

Volume of initial transaction:

$$\frac{10,000,000 \cdot 101.5}{100} + \left[(10,000,000 \cdot 0.06) \cdot \left(\frac{153}{360} \right) \right] = 10,405,000.00$$

Volume of forward transaction:

$$10,405,000 [1+(0,03*30/360)] = 10,431,012,50$$

Dirty price forward transaction

$$(10,431,012.50/10,000,000) * 100 = 104.310125$$

Clean price of forward transaction

$$104.310125 - (0.06 * 183/360 * 100) = 101.260125$$

Margins

Under buy-and-sell-back a haircut can be included in the same way as for a classic repo. The price of the initial transaction changes.

$$\text{Price initial transaction} = \text{dirty price} / (1+\text{haircut})$$

The price of the forward transaction is determined analogously to the classic repo procedure.

Since the transactions in buy-and-sell-back repos are separate legal agreements, no margin calls are possible. The equivalent to margin calls is the so called Close and Reprice. In a Close and Reprice, the initial deal is terminated if the collateral hit a specific price and established again with the new market price, based on the original repo rate and the original maturity date.

This way, Close and Reprice has the same effect as margin calls. Like with margin calls, Close and Reprice adjustments can be undertaken on the cash as well as the securities' side.

Substitution

As the two transactions are separate, there is no possibility of substituting on security for another. As with margin calls, the only possibility is for the two parties to agree to lose out the existing buy-and-sell-back and establish a new deal based on the same repo rate.

4. Security Lending

Security lending is the exchange of two securities for the term of the deal. This is sensible if the seller of the security does not need cash and wants to wait until his security turns special. With other words, securities lending is the exchange of two securities, where one is usually a special and the other a general collateral.

Quote

The terminology in securities lending follows that in a classic repo but takes the viewpoint of the special. The “lender” is therefore the party lending the special and the borrower is the party borrowing the special.

Since in securities lending no cash transfers take place, a premium (=fee) in % p.a. based on the market value of the security is quoted instead of the repo. This fee has to be paid by the buyer.

Coupon payment

Coupon payments are treated analogously to classic repos

Margins

Like in a classic repo, initial margin and margin calls can be required under securities lending.

Contrary to the classic repo, the initial margin must be paid by the buyer of the special because it is the securities lent which are driving the deal.

Margin calls are paid in the same way as in classic repo, but this generally by adjusting the amount of collateral rather than the amount of the security lent (=special, because the borrower has a need for that particular amount of that security).

5. Economic background of sale and repurchase agreements

As outlined above, the repurchase price of a repo is independent of the price development of the underlying security, i.e. the economic risk of the security stays with the pledgor. Sale and repurchase agreements are therefore no instruments to speculate on price changes but they are cash loans backed by securities or security loans backed by cash (depending on the point of view).

The pledgor finances his securities at the repo rate for the time of the transaction. If he gets a rate that is below that for unsecured money transactions, the difference must be interpreted as a premium for lending the securities that has been paid by the pledgee to the pledgor. In this case, we speak of the security as "special". If the repo rate the money market rate, we speak of a general collateral transaction (GC transaction). In this case, the emphasize is put on the cash loan backed by securities.

To the pledgee, bonds are securities against the lent money. He is the proprietor of the bonds for the period of the deal and they are at his disposal. He might use them on following repos, to overcome problems of delivery, or as security loan, too.

A main characteristic of repos is the shift of risks from the counterparties to the bond: the counterparty risk equals the risk of the bond's price changes. If the issuer of the bond has a top rating, the risk is correspondingly small. If both parties agree on a daily mark to market and the duty to make additional payments (liable to assessments), the risk is reduced to an overnight risk. Therefore, repurchase agreements need only small credit lines for the contracting parties. This means, that the repo market offers market participants with low ratings, who were otherwise excluded from the money market due to high credit risk, to deal with each other.