MT1470 Analytical Finance II

Seminar Project, 1 p

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Department of
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REPOS AND REPO MARKETS

Seminar Project In Analytical Finance II

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INTRODUCTION

[1] Repo? Isn't that what the collection agency does when you fail to pay your bills, or do they just come and break one of your knees? Fortunately, the type of repo we're talking about has nothing to do with collection agencies, gangsters, or limping on your good leg.

Repo is short for repurchase agreement. They are classified as a money-market instrument and are usually used to raise short-term capital. Those who deal in government securities use repos as a form of overnight borrowing. They are usually very short-term, from overnight to 30 days or more. This short-term maturity and government backing means repos provide lenders with extremely low risk.

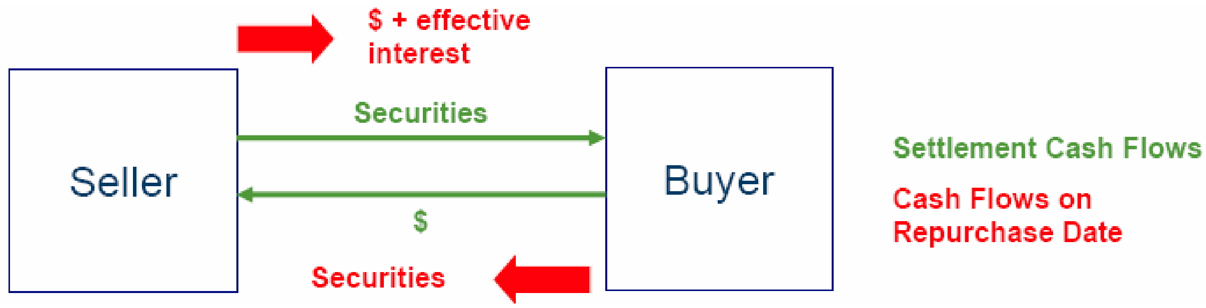
Repos are popular because they can virtually eliminate credit problems. Unfortunately, a number of significant losses over the years from fraudulent dealers suggest that lenders in this market have not always checked their collateralisation closely enough.

The over-the-counter repo market is now one of the largest and most active sectors in the US money market. Repos are widely used for investing surplus funds short term, or for borrowing short term against collateral. Dealers in securities use repos to manage their liquidity, finance their inventories, and speculate in various ways. The Fed uses repos to manage the aggregate reserves of the banking system.

[1] http://www.investopedia.com/university/moneymarket/moneymarket7.asp

REPURCHASE AGREEMENTS

[2] Repos, short for repurchase agreements, are contracts for the sale and future repurchase of a financial asset, most often Treasury securities. On the termination date, the seller repurchases the asset at the same price at which he sold it, and pays interest for the use of the funds. Although legally a sequential pair of sales, in effect a repo is a short-term interest-bearing loan against collateral.



The annualized rate of interest paid on the loan is known as the repo rate. Repos can be of any duration but are most commonly overnight loans. Repos for longer than overnight are known as term repos.

The overnight repo rate normally runs slightly below the Fed funds rate for two reasons: First a repo transaction is a secured loan, whereas the sale of Fed funds is an unsecured loan. Second, many who can invest in repos cannot sell Fed funds.

[3] While a repo is legally the sale and subsequent repurchase of a security, its economic effect is that of a secured loan. Economically, the party purchasing the security makes funds available to the seller and holds the security as collateral. If the repoed security pays a dividend, coupon or partial redemptions during the repo, this is returned to the original owner. The difference between the sale and repurchase prices paid for the security represent interest on the loan. Indeed, repos are quoted as interest rates.

The party who sells and later repurchases a security is said to perform a repo. The other party – who purchases and later resells the security – is said to perform a reverse repo.

Securities dealers use repos to finance their securities inventories. They repo their inventories, rolling the repos from one day to the next. Counterparties may be institutions, such as money market funds, who have short-term funds to invest, or they may be parties who wish to briefly obtain use of a particular security.

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[2] http://wfhummel.cnchost.com/repos.html
[3] http://www.riskglossary.com/link/repo.htm

For example, a party may want to sell the security short, or they may need to deliver the security to settle a trade with another party. Accordingly, there are two possible motives for entering into a reverse repo:

- short-term investment of funds, or
- to obtain temporary use of a particular security.

In the latter case, the security is called a special security. In the former case, it is called general collateral or GC.

Interest rates payable on special repos tend to be lower than those payable on GC repos. This is because a party reverse repoing a special security will accept a reduced interest rate on its funds in exchange for receiving the special security it requires. Economically, the transaction is no different from cash collateralized securities lending. Pricing of either type of deal depends upon demand for the desired security.

Because repos are essentially secured loans, their interest rates do not depend upon the respective counterparties' credit qualities. For GC repos, the same rates apply for all counterparties. Accordingly, GC repo rates – or simply repo rates – are benchmark short-term interest rates that are widely quoted in the marketplace. They differ from LIBOR rates in that they are for secured loans whereas LIBOR rates are for unsecured loans.

DEFINITIONS[4]

- ✓ **Repo**
  A contract in which the seller of securities, such as Treasury Bills, agrees to buy them back at a specified time and price. Also called repurchase agreement or buyback.
- ✓ **Reverse Repo**
  The complete opposite of a repo, where a dealer buys government securities from an investor and then sells them back on a later date at a higher price.
- ✓ **Open repo**
  Repo which can be terminated by either party at any time, and which has an unspecified repurchase date.

[4] http://www.investorwords.com/4186/repo.html

- ✓ **Overnight repo**
  A repo with a term of one day.
- ✓ **Term repo**
  A repo with a term of more than one day (for a month or more!).
- ✓ **Purchase agreement**
  A legal agreement detailing a sale of property, including price and terms.
- ✓ **Leaseback**
  Arrangement in which one party sells a property to a buyer and the buyer immediately leases the property back to the seller. This arrangement allows the initial buyer to make full use of the asset while not having capital tied up in the asset. Leasebacks sometimes provide tax benefits.

REPOS ARE NOT FOR SMALL INVESTORS[5]

The largest users of repos and reverses are the dealers in government securities. As of August 2004 there were 22 primary dealers recognized by the Fed, which means they were authorized to bid on newly-issued Treasury securities for resale in the market. Primary dealers must be well-capitalized, and often deal in hundred million dollar chunks. In addition there are several hundred dealers who buy and sell Treasury securities in the secondary market and do repos and reverses in at least one million dollar chunks.

The balance sheet of a government securities dealer is highly leveraged, with assets typically 50 to 100 times its own capital. To finance the inventory, there is a need to obtain repo money in large amounts on a continuing basis. Big suppliers of repo money are money funds, large corporations, state and local governments, and foreign central banks. Generally the alternative of investing in securities that mature in a few months is not attractive by comparison. Even 3-month Treasury bills normally yield less than overnight repos.

[5] http://wfhummel.cnchost.com/repos.html

CLEARING BANKS AND DEALER LOANS – AN EXAMPLE[6]

A securities dealer must have an account at a clearing bank to settle his trades. For example, suppose ABC Company has $20 million to invest short term. After negotiating the terms with the dealer, ABC has its bank wire $20 million to the clearing bank. On receipt, the clearing bank recovers the funds it loaned the dealer to acquire the securities being sold, plus interest due on the loan. It then transfers the sold securities to a special custodial account in the name of ABC. Since government securities exist as book entries on a computer, this is a trivial operation.

The next morning the dealer repurchases the securities from ABC, pays the overnight interest on the repo, and regains possession of the securities. Assuming a 5% repo rate, the interest due on the $20 million overnight loan would be $2,777.78, which is based on a 360-day year. If both parties agree, the repo could be rolled over instead of paid off, thus providing another day of funds for the dealer and another day of interest for ABC.

If the dealer is short on funds needed to repurchase the securities, the clearing bank will advance them with little or no interest if repaid the same day. Otherwise the bank will charge the dealer interest on the loan and hold the securities as collateral until payment is made. Since dealer loans typically run at least 25 basis points above the Fed funds rate, dealers try to finance as much as they can by borrowing through repos. By rolling over repos day by day, the dealer can finance most of his inventory without resorting to dealer loans. It is sometimes advantageous to repo for a longer period, using a term repo to minimize transaction costs.

Clearing banks charge a fee for executing dealer transactions. They prefer not to issue large dealer loans because it ties up the bank's own reserves at little profit. In truth, there is not enough capacity in all of the clearing banks in New York to provide dealer loans sufficient to cover the financing needs of the large securities dealers.

[6] http://wfhummel.cnchost.com/repos.html

REPOS AS MONETARY POLICY[7]

Repos are useful to central banks both as a monetary policy instrument and as a source of information on market expectations. Repos are attractive as a monetary policy instrument because they carry a low credit risk while serving as a flexible instrument for liquidity management. In addition, they can serve as an effective mechanism for signalling the stance of monetary policy. Repos have been widely used as a monetary policy instrument among European central banks and with the start of EMU in January 1999, the Eurosystem adopted repos as a key instrument. Repo markets can also provide central banks with information on very short-term interest rate expectations that is relatively accurate since the credit risk premium in repo rates is typically small. In this respect, they complement information on expectations over a longer horizon derived from securities with longer maturities.

REPOS & RISK

An assessment of the risks faced by repo market participants can help identify the conditions necessary for sound repo markets. Like other financial markets, repo markets are subject to some credit risk, operational risk and liquidity risk. However, what distinguishes the credit risk on repos from that associated with uncollateralised instruments is that repo credit exposures arise from volatility (or market risk) in the value of collateral.

For example, a decline in the price of securities serving as collateral can result in an under-collateralisation of the repo. Liquidity risk arises from the possibility that a loss of liquidity in collateral markets will force liquidation of collateral at a discount in the event of a counterparty default. Leverage that is built up using repos can increase these risks. While leverage facilitates the efficient operation of financial markets, rigorous risk management by market participants using leverage is important to maintain these risks at prudent levels.

Repo markets have offsetting effects on systemic risk. They are likely to be more resilient than uncollateralised markets to shocks that increase uncertainty about the credit standing of counterparties, limiting the transmission of shocks. However, this benefit could be somewhat reduced by the fact that the use of collateral in repos withdraws securities from the pool of assets that would be available to unsecured creditors in the event of a bankruptcy. Another concern is that the close linkage of repo markets to securities markets means they may help transmit shocks originating from this source. Finally, repos allow institutions to use leverage to take larger positions in financial markets, which could add to systemic risk.

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[7] This and the next two sections from: http://www.bis.org/publ/cgfs10.htm

SOUND AND EFFICIENT MARKETS

There are a number of structural features and market practices that support sound and efficient repo markets. Some, such as an adequate legal framework and settlement system and good margining practices, are essential to limit risks and to ensure the efficient and sound operation of markets, while others are probably less crucial. In addition to promoting these features and practices, authorities may want to conduct market surveillance of repo markets to help ensure that such practices are respected and to help detect instances of market manipulation or abuse. A number of features and market practices are especially important for sound and efficient repo markets:

- ✓ **An adequate and efficient legal framework**.
  There should be a clear legal definition of the repo contract (including buy/sell-back and securities lending agreements), an essential feature being unambiguous certainty as to legal rights vis-à-vis the counterparty in the event of a default. The legal framework should be complemented by well-structured legal documentation, such as master agreements.

- ✓ **Secure and efficient settlement systems**.
  Since the securities leg of a repo serves as collateral for the cash leg, the failure to settle simultaneously opens up a credit exposure. This risk can be contained using safe settlement procedures based on delivery-versus-payment (DVP) arrangements.

- ✓ **Appropriate haircuts and margin call practices**.
  While the use of collateral reduces credit risk, market participants remain exposed to credit risk arising from volatility in the value of collateral, counterparty default and liquidity risk. Haircuts and margin call practices limit these risks provided they are set at levels commensurate with risks and adjustments are implemented promptly when appropriate.

- ✓ **Adequate transparency**.
  To effectively manage their risk in repo markets, creditors need to have sufficient comprehensive and relevant information to assess the risks they face on an ongoing basis. However, provision of such information need not compromise proprietary information.

REPOS IN SWEDEN[8]

The Swedish National Debt Office uses repo transactions commercially, primarily to finance and invest liquidity deficits and surpluses. Repos are also used to ensure that the market functions properly and to maintain high liquidity in the Treasury bond market.

The borrowing requirement determines what repos the Debt Office makes, as well as their pricing. The Debt Office carries out repo transactions with its authorised dealers. The referred repo rate is set by the Riksbank.

The Debt Office uses different types of repos for **liquidity management** and **market repos**. [9]

LIQUIDITY MANAGEMENT REPOS

Financing repos
The Debt Office uses financing repos when it has a borrowing requirement. The interest rates depend on the demand for a specific security.
Reverse repos
When there is a liquidity surplus, the Debt Office can carry out reverse repos, that is, invest its liquidity surplus with the dealers in exchange for securities.

MARKET REPOS

When there is a liquidity surplus and no need for financing liquidity management, the Debt Office can carry out market repos. The aim is to avoid shortages in the government securities market.

Guaranteed repos
Repo swaps
Nominal repo amounts will be chosen to make the settlement amounts of the two repos equal
New bonds and bills
The Debt Office has a market repo for nominal bonds and bills with an outstanding stock below SEK 15 billion and SEK 10 billion respectively. The volume remaining to attain those levels is divided equally among the dealers.

Euro loans
The Debt Office offers repo facilities for the two outstanding euro loans, 1043E and 1044E.

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[8] http://www.rgk.se/scripts/cgiip.exe/cm/pub/showdoc.p?docid=508
[9] See appendix for more on the Riksbanks referred repo rate and Debt Offices repos, pricing and limits.

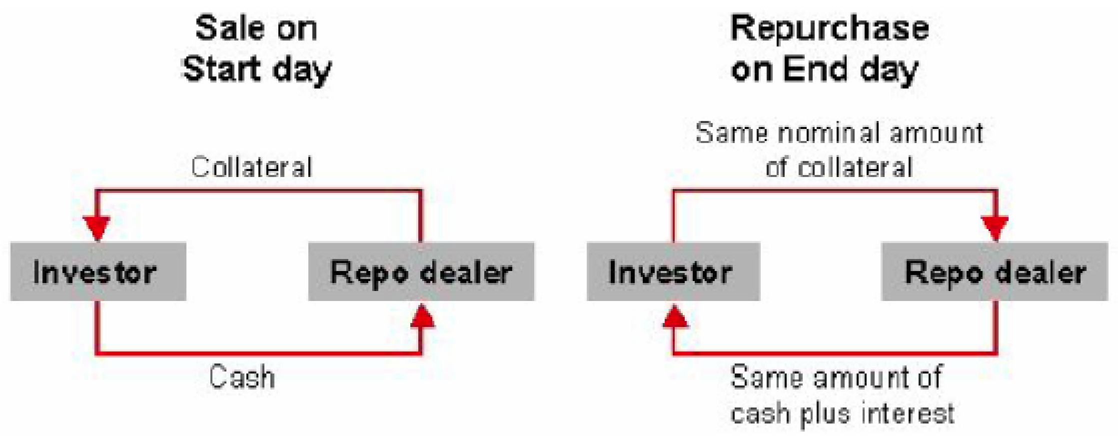
SUMMING UP[10]

Repo rate is the interest rate for a repurchase agreement. This is the rate you have to pay by selling a security only to buy it back after a short period. The period is usually some of:

- ✓ O/N (Over-Night-repo)
- ✓ T/N (Tomorrow-Next)
- ✓ C/W (Corporate-Week)

The government repo rate is the rate when government uses their own bills, notes or bonds. Sometimes this rate is used to calculate the carry cost for instruments with underlyings.

A Repo/Reverse involves the sale of assets and a simultaneous agreement to repurchase the same or similar equivalent assets at a future date or on demand for the original value plus a return on the use of the cash.



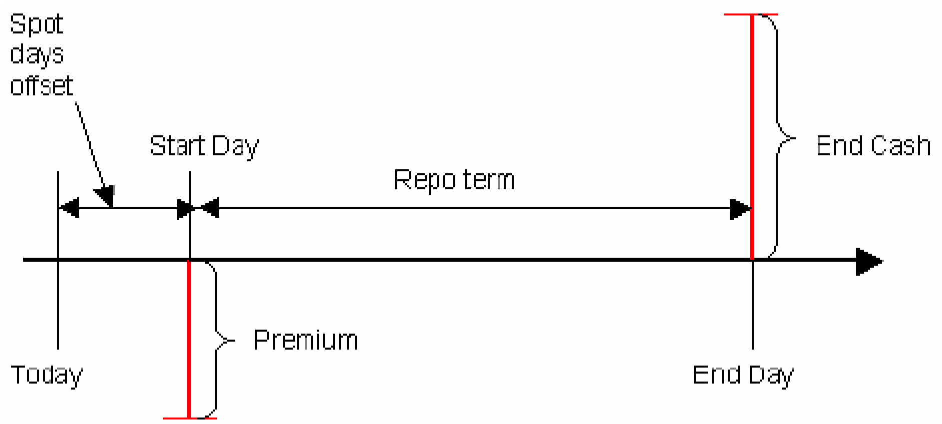
- A **Repo** involves lending securities with agreement to repurchase at some time in the future.
- A **Reverse** involves borrowing securities with an agreement to sell them back at some time in the future.

[10] http://janroman.net.dhis.org/doc/lnotes/AFII/Cash-Flow%20Instruments%202.pdf (p.21 & 65-66)

The general cash flow structure of Repo/Reverse instruments depend on the following factors:

- Is the deal a Repo or Reverse transaction?
- Is the required rate of return fixed, or based on a floating reference rate?

When you are entering into a typical fixed rate "reverse" you face the following cash flow structure:



You pay a premium at start day and receive (borrow) securities as collateral. After the term, you return the securities and receive a cash amount equal to your initial premium plus interest earned during the repo term.

CONCLUSION

As we saw, repos require some wealth to be used, and thus, are not instruments for everyone. However, the OTC repo market is now one of the largest and most active sectors in the US money market.

With low credit risk and high liquidity repos are widely used for investing surplus funds short term, for borrowing short term against collateral, and in general, to speculate in various ways.

The Fed uses repos to manage the aggregate reserves of the banking system, making repos a useful monetary policy instrument to central banks.
Indeed, in Europe, this feature has been widely used among central banks and with the start of EMU in January 1999, the Eurosystem adopted repos as a key instrument. Repos also serve as a source of information on market expectations.

The repo structure itself is quite self-explanatory and requires no further repetition, and with these words the report has come to the end.

REFERENCES

Jan R. M. Röman. (2005). *Lecture notes in Analytical Finance II.*
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http://www.riksbank.com/templates/Page.aspx?id=12182

http://www.rgk.se/scripts/cgiip.exe/cm/pub/showdoc.p?docid=508

http://www.rgk.se/showdoc.asp?docid=927

APPENDIX

AS OF JUNE 1994 THE RIKSBANK'S KEY INTEREST RATES ARE:

THE REPO RATE

The rate of interest at which banks can borrow or deposit funds at the Riksbank for a period of seven days.

THE DEPOSIT RATE

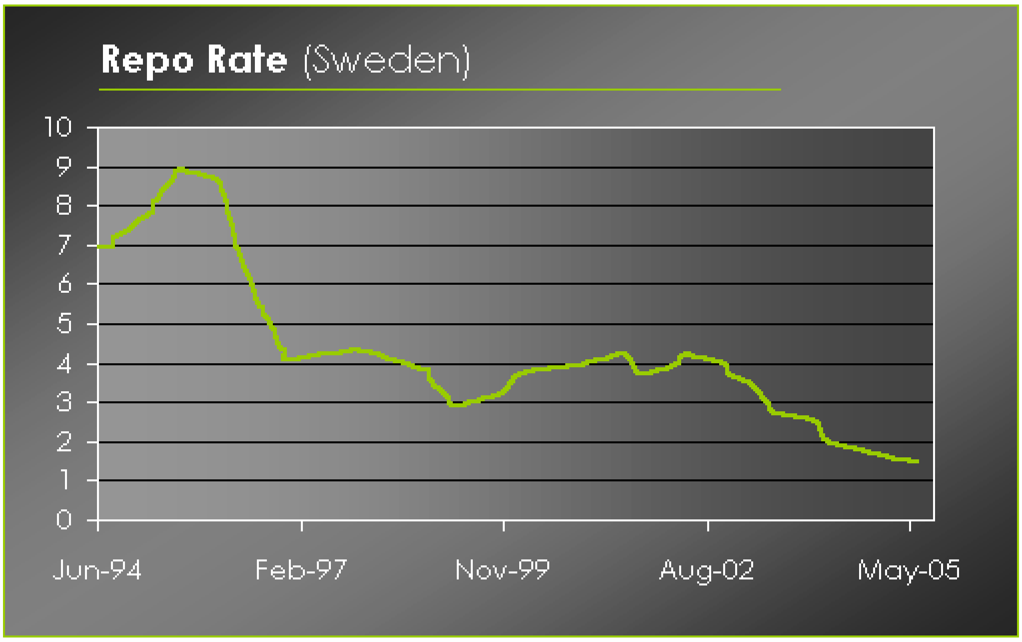
The rate of interest banks receive when they deposit funds in their accounts at the Riksbank overnight and is always 0.75 percentage points lower than the repo rate.

THE LENDING RATE

The rate of interest banks pay when they borrow overnight funds from the Riksbank and is always 0.75 percentage points higher than the repo rate.

The predecessor to the repo rate, deposit rate and lending rate was the marginal rate.

[http://www.riksbank.com/templates/Page.aspx?id=12182]



[http://www.riksbank.com/templates/Page.aspx?id=12182]

Repo type	Pricing	Volume
Commercial	Variable	Total of SEK 10 billion and SEK 2 billion per government security
Guaranteed		
- Benchmark bonds	60 basis points below the repo rate	SEK 500 million per dealer and government security
- EIM Benchmark bonds1	60 basis points below the repo rate	SEK 1.000 million per dealer and government security
- Treasury bills	25 basis points below the repo rate	SEK 500 million per dealer and government security
- Inflation-linked bonds	15 points below the repo rate	SEK 500 million per dealer and government security
Repo swaps		
- Treasury bills	15 basis points interest rate differential	SEK 500 million per dealer and government security
- Inflation-linked bonds	15 basis points below the repo rate	SEK 200 million per dealer and government security
Newly introduced bonds and bills	15 basis points below the repo rate	Volume remaining for the outstanding stock for each treasury bill and bond to amount to SEK 10 and 20 billion respectively, divided by the number of dealers
Euroloan	Appr. 25 basis points below the equivalent Euro GC	Total of EUR 500 million per loan

[1] EIM (electronic interbank market) benchmark bonds, are bonds traded in the electronic system.

[http://www.rgk.se/scripts/cgiip.exe/cm/pub/showdoc.p?docid=508]

Terms and conditions of market repos and exchanges – overview

Instrument	Pricing [1]
General facilities	
Repos T/N (O/N with a premium of 5 basis points)	
Nominal benchmark bonds	-30
Inflation-linked bonds	-10
Treasury bills	-15
Repo swaps T/W, fixed volume of MSEK 500 per dealer & government security	
Nominal benchmark bonds	-20
Inflation-linked bonds	-10
Treasury bills	-10
Exchanges of inflation-linked bonds, MSEK 100 per dealer & day, max. MSEK 250	
Special facilities	
Repos in newly issued nominal bonds, up to SEK 20 billion	-10
Repos in newly issued treasury bills, up to SEK 10 billion	-10
Repos in Euro government bonds (see below)	
Repos in nominal non-benchmark bonds	-80
Exchanges of non-benchmark bonds for treasury bills, premium of 2 basis points	

[1] *Numbers reads: basis points below the repo rate of the Riksbank.*

[http://www.rgk.se/showdoc.asp?docid=927]