ARTICLES

EURO REPO MARKETS AND THE FINANCIAL MARKET TURMOIL

Repos (i.e. sale and repurchase agreements) are an important money market instrument for market participants in search of liquidity or specific securities. As a fund-raising tool, repos are an alternative to unsecured loans and the issuance of short-term securities.

The financial market turmoil that began in August 2007 has affected the euro repo markets in several ways, leading to a significant decline in repo market turnover and outstanding amounts. Special repo markets and repos collateralised using non-government securities have suffered most, while general collateral (GC) repos – and, in particular, government bond repos – have gained market share. As the bulk of euro repos are collateralised using liquid and safe assets, repo market activities have declined less than activities in unsecured money markets.

Eurosystem monetary policy operations have played an important role for repo markets during the turmoil. The increased provision of liquidity – including liquidity at longer maturities – has been essential in order to provide the banking system with liquidity insurance, but it may have had a negative impact on turnover in the interbank repo market. The Eurosystem's collateral policy has helped to improve the availability of high-quality collateral in interbank repo markets.

1 THE RELEVANCE OF REPO MARKETS FOR THE EUROSYSTEM

Money markets play a decisive role in the implementation of monetary policy as the place where credit institutions trade short-term funds – the first element in the transmission of monetary policy. Money markets provide information which is used by central banks (including the ECB) in the implementation of monetary policy. In turn, specific features of the implementation of monetary policy may have an immediate impact on money markets – particularly trading volumes and rates. This is true not only for unsecured money markets, but also for repo markets. This explains the Eurosystem's interest in this market segment.

A repo is essentially a transaction in which one market participant borrows funds from another market participant against collateral (see Box 1 for more details). The Eurosystem's credit operations are a close substitute for repo markets, since market participants can raise funds against collateral through interbank repos, as well as through the Eurosystem. An increase in the amount of credit provided by the Eurosystem may therefore have implications for volumes and rates in repo markets. Similarly, changes in the maturity profile of Eurosystem credit operations may affect repo markets' maturity structure and yield curve.

Furthermore, of specific importance in this respect is the collateral policy of the Eurosystem. An asset deposited with the Eurosystem as collateral cannot be used to collateralise a loan in the repo market at the same time. This means that the more the Eurosystem accepts collateral that is not accepted (or hardly ever accepted) in the repo market, the more collateral becomes available for repo market transactions. The Eurosystem has always accepted a broad range of assets as collateral for its credit operations, including private sector bonds and non-marketable assets. This has given banks the option of using less liquid assets as collateral in Eurosystem operations and keeping highly liquid assets – particularly euro area central government bonds – for use in repo market transactions. The fact that the Eurosystem accepts a broad range of assets as collateral may have played an important role in the stabilisation of financial markets in the course of the turmoil.

Anecdotal evidence also suggests that, during the turmoil, assets have needed to be eligible for use in Eurosystem operations in order to be generally accepted in repo markets. A cash

lender is typically allowed to reuse collateral assets (i.e. it is entitled, where necessary, to use assets received as collateral in order to raise cash in a repo transaction). However, such reuse requires a party that is prepared to accept those assets as collateral. If an asset is eligible for use in Eurosystem operations, this ensures that it can indeed be reused in a transaction with a Eurosystem central bank. Moreover, if a borrower defaults, the lender of the relevant cash may need to quickly exchange that collateral for cash, at least on a temporary basis. If the collateral is eligible for use in Eurosystem operations, this can be done in a Eurosystem liquidity-providing operation.

This article describes the impact that the financial market turmoil has had on repo markets and discusses the links between Eurosystem operations and repo markets that have proved most important during the turmoil. Section 2 compares the impact on the repo market with the impact on the unsecured money market. Section 3 discusses the performance of different segments of the repo market, while Section 4 provides a summary and looks to the future.

Box 1

REPOS: BASIC DEFINITIONS

A repo operation (i.e. a sale and repurchase agreement) is defined as an agreement between a cash borrower and a cash lender that stipulates that the cash borrower (also referred to as the "repo seller"):

- sells assets to the cash lender (or "repo buyer") for a certain amount of cash (the repo's "nominal amount"); and

- will buy these (or similar) assets back at a later date for the same amount of cash, plus interest as payment for the use of that cash.

Thus, a repo agreement involves two transactions: the sale and repurchase of assets. Economically, a repo is similar to a secured cash loan: the cash borrower receives a loan from the cash lender and provides assets as collateral. In a repo transaction, however, legal ownership of the assets is transferred from the borrower to the lender. This implies that the lender is allowed to sell the assets on to a third party, provided that it is able to buy them back in order to return the assets to the borrower when the transaction matures. If the borrower defaults on its obligation to pay back the cash (plus interest), the lender can liquidate the assets immediately, as it is the owner of those assets. It does not need to wait until insolvency procedures have been concluded. This means that a lender is better protected in a repo transaction than in a secured loan transaction.

The main elements of a repo are the maturity, the nominal amount, the repo rate, the collateral assets and the haircut. Most repos have a fixed maturity, which can range from one day to more than one year. There are three types of repo with a maturity of one day: overnight repos are traded and settled on the same day and mature the day after; tomorrow/next repos are settled one day after the trade and mature two days after the trade; and spot/next repos are settled two days after the trade and mature three days after the trade. Around 5% of repos are open repos,[1] in which both parties to the transaction may terminate the repo at any point in time.

1 See ICMA European Repo Market Survey No 17, June 2009.

The repo rate is the interest rate that determines the interest payment made by the cash borrower at the end of the repo (i.e. the percentage of the repo's nominal amount that is to be paid as interest). The majority of repos have a fixed repo rate, while floating rate repos account for around 9% of all repos.[2] In a floating rate repo, the repo rate is defined with reference to a rate such as the EONIA or the EURIBOR, to which a positive or negative spread is added. Thus, the repo rate changes when the reference rate changes.

Parties to a repo may agree on a specific asset (i.e. a specific ISIN code) as collateral. Such transactions are called "special repos". If, rather than a specific asset, the repo agreement specifies a basket of assets (i.e. a list of ISIN codes), the transaction is referred to as a "general collateral (GC)" repo. A GC basket may, for example, include bonds issued by euro area central governments. In a GC repo, the cash borrower (or its agent) decides which of the basket of assets to actually use as collateral. GC repos are always cash-driven – i.e. they come about because the cash borrower wishes to raise cash. Special repos are typically securities-driven – i.e. the repo is initiated by a cash lender searching for a specific asset. The cash lender may, for example, wish to sell the security short (i.e. without holding it), as it expects the price of the security to decline. In order to deliver the security in question, it first has to borrow that security through a special repo. The repo rates of special repos are often very close to GC repo rates, but they may be significantly below the GC repo rate if there is strong demand for that particular security. In this case, repo traders say that the security is "on special".

To ensure that both parties are protected against a default by their counterparty, the collateral value and the cash value of the repo should be close to each other. If the collateral value is lower, the cash lender incurs losses if the borrower defaults. If it is higher, the borrower incurs losses if the lender defaults. For that reason, the collateral is valued at the "dirty" (i.e. including the interest accrued) mid-market price. However, the market for the collateral asset may not be fully liquid, so there is a risk of the asset being sold for less than the mid-price. This is the main reason for the application of initial margins or haircuts. A haircut of 2%, for example, means that the market value of the collateral is supposed to be 2% higher than the nominal cash value of the repo. A 2% haircut is relatively common for collateral consisting of bonds issued by the central governments of industrial countries. By way of example, haircuts on bonds issued in emerging market countries may exceed 50%.

The market value of the collateral may change over the life of the repo. To adjust for asset price changes, variation margins are used. The collateral is marked to market, typically on a daily basis. If the collateral value declines, the borrower has to deposit additional assets. If the value of that collateral increases, assets are returned to it.

2 See ICMA European Repo Market Survey No 17, June 2009.

2 REPO MARKETS AND UNSECURED MONEY MARKETS

INTEREST RATE SPREADS

A good starting point for a comparison of the performance of the unsecured interbank market and the repo market is developments in interest rate spreads in those two markets. When the turmoil began in August 2007, the unsecured interbank money market was significantly affected, and it has remained under pressure since then. Spreads between EURIBOR rates and overnight interest rate swap (OIS) rates, having been close to zero prior to August 2007, jumped to unprecedented levels within a few days.

When tensions peaked in September 2008 following Lehman Brothers' default, EURIBOR spreads increased even further to stand at levels close to 180 basis points for three-month maturities (see Chart 1).

Repo rates depend on the quality of the assets used as collateral. If one is to compare repo rates with unsecured interbank market rates, one must first decide which of the various repo rates to consider. As euro area government bonds are the most commonly used asset in the euro repo market (see Section 3), it is reasonable to use EUREPO rates in this context. EUREPO rates are provided by the European Banking Federation and refer to GC repo transactions with euro area government bonds as collateral. As shown in Chart 1, spreads between EUREPO rates and OIS rates remained low on average until September 2008, before increasing somewhat in the wake of Lehman Brothers' default and returning to pre-turmoil levels in the third quarter of 2009. This clearly suggests that the turmoil has had much less impact on repo rates than on unsecured interbank market rates.

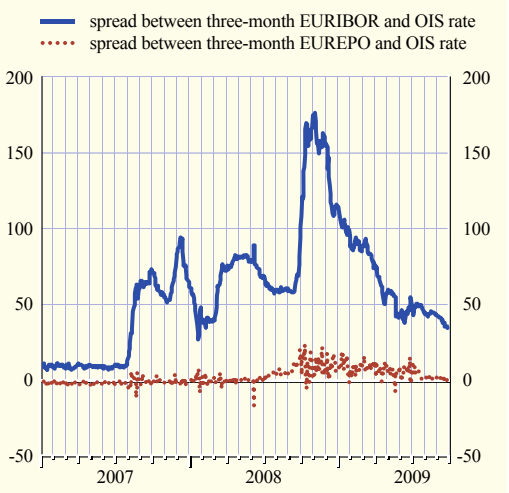
Two factors may have contributed to the resilience of EUREPO rates during the turmoil. First, high-quality collateral protects the cash lender against the risk of financial losses in the event of the borrower defaulting. This reduces the credit risk premium in EUREPO rates. Second, it is relatively easy for the cash lender to reuse high-quality collateral to borrow funds in the repo market or from the Eurosystem if need be. This reduces the funding liquidity risk premium in EUREPO rates. As will be discussed later, these two aspects play a less pronounced role when the quality of the collateral is lower.

VOLUMES

The turmoil has had a significant impact not only on interest rate spreads, but also on turnover in the unsecured interbank market. This market experienced strong and steady growth between 2002 and 2007, but contracted by 12% between the second quarter of 2007 (i.e. prior to the onset of the turmoil) and the second quarter of 2008, and by another 25% in the following year, bringing the market back to levels last seen in 2002 (see Chart 2).[1]

Chart 1 Spreads between the three-month EURIBOR and EUREPO rates and the OIS rate

(basis points)



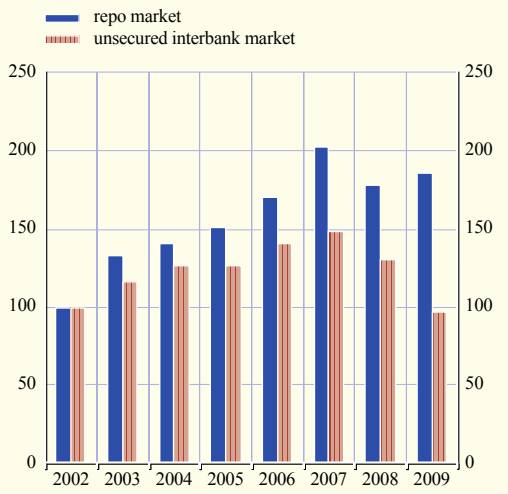
Sources: Thomson Reuters and European Banking Federation.

The repo market appears to have been affected to a similar extent in the first year of the turmoil, but less severely in the second year. Overall, turnover in the repo market grew more strongly than turnover in the unsecured interbank market between 2002 and 2007, before contracting by around 12% between the second quarter of 2007 and the second quarter of 2008, and growing by around 5% in the following year.

1 This article's analysis of volumes in interbank markets is based on two sources: the ECB's Euro Money Market Survey and the European Repo Market Survey of the International Capital Market Association (ICMA). The Euro Money Market Survey is based on information provided by a panel of large banks and is conducted on an annual basis. Reporting banks provide data on their activities in unsecured money markets and repo markets during the second quarter of the reporting year. Quantitative data refer to market turnover in the interbank market (i.e. transactions between banks and non-banks are not included). The ICMA's European Repo Market Survey is also based on data reported by a panel of large banks. It covers only repo markets and includes data on outstanding amounts of repo transactions (i.e. open interest) as at two snapshot dates per year (one in June and one in December). The survey is published twice a year.

Chart 2 Turnover (lending plus borrowing) in the interbank money market

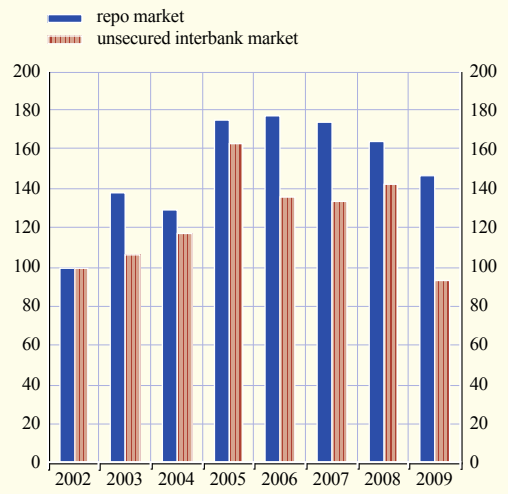
(index: 2002 = 100)



Source: ECB Euro Money Market Survey.
Note: Constant panel of 105 banks.

Chart 3 Maturity-weighted turnover (lending plus borrowing) in the interbank money market

(maturities of up to one year; index: 2002 = 100)



Source: ECB Euro Money Market Survey.
Note: Constant panel of 105 banks.

The data displayed in Chart 2 do not take into account the maturity of transactions. A repo with a maturity of one day and a one-year repo are treated in the same way. It is therefore important to complement this analysis with data on maturity-weighted turnover.[2] Maturity-weighted turnover is a better indicator of the size of the repo market than pure turnover. As Chart 3 shows, maturity-weighted turnover in the repo market declined from 2007 to 2008, and again from 2008 to 2009. In the unsecured interbank market, this measure increased slightly from 2007 to 2008, before declining sharply the following year. The total decline in maturity-weighted turnover between the second quarter of 2007 and the second quarter of 2009 was 16% in the repo market and around 31% in the unsecured interbank market.

However, it is important to note that indicators of the size of the repo market may be sensitive to changes in their methodology. As mentioned above, Chart 3 – which is based on the ECB's Euro Money Market Survey – shows a 16% decline in maturity-weighted turnover in repo markets between the second quarter of 2007 and the second quarter of 2009. Data in the ICMA's European Repo Market Surveys (see Chart 4) indicate a 35% decline in outstanding amounts in European repo markets between June 2007 and June 2009, compared with a 16% decline in maturity-weighted turnover.

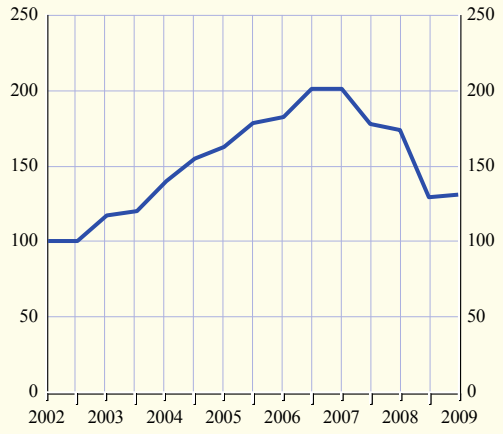
Overall, the data suggest that euro repo market volumes have declined significantly as a consequence of the turmoil, but probably somewhat less than volumes in unsecured euro money markets. What could explain these developments?

Four main factors could explain the declines observed in repo market volumes. First, banks typically started to deleverage after the onset of the turmoil. Bank balance sheets have been shrinking for more than two years now, which may have had a negative impact on banking activities – particularly lending and borrowing activities. As will be shown below, that deleveraging has also resulted in a sharp reduction in short-selling activities. As a consequence, turnover in the special repo segment has contracted, while the GC repo market has suffered

2 Maturity-weighted turnover is the sum of the volumes of all transactions multiplied by the respective number of days to maturity.

Chart 4 Outstanding amounts (lending plus borrowing) in European repo markets

(index: June 2002 = 100)



Sources: ICMA European Repo Market Surveys and ECB calculations.
Notes: The number of banks participating varies from survey to survey, so the total outstanding amounts in the various surveys are not comparable. However, each survey provides information on the percentage change in the outstanding amounts of those banks that participated in the three most recent surveys. This chart has been produced on the basis of that information.

less. Second, central banks have intermediated between banks. The Eurosystem, for example, increased the amount of euro-denominated credit provided to counterparties from less than €500 billion in the third quarter of 2008 to more than €800 billion in the final quarter of 2008, when tensions in financial markets peaked. The increased provision of liquidity has allowed banks to borrow more from the Eurosystem and less in the interbank market. This has created excess liquidity, which has been returned to the Eurosystem's deposit facility. Thus, the Eurosystem's liquidity measures have replaced some transactions in the interbank market. Third, as will be discussed in more detail in Section 3, although most of the assets used as collateral in the repo market are of relatively high quality, less liquid assets are used in some repo market segments. These assets provide the cash lender with less protection against losses in the event of the borrower defaulting, and it may be difficult for the lender to reuse them. As a consequence, the use of such assets as collateral has become more costly (and in many cases impossible) during the turmoil. Fourth, some market participants have been under severe pressure and unable to borrow funds despite being able to provide high-quality collateral, as lenders have wanted, given the high degree of uncertainty, to avoid any risks related to defaulting counterparties in repos. Nevertheless, the fact that repo transactions are, to a large extent, secured by high-quality assets is certainly the main reason why repo markets have probably been less affected by the turmoil than the unsecured interbank market.

Interestingly, as a paper published in the BIS Quarterly Review[3] pointed out, the US repo market has experienced more problems than the euro repo market. Three major factors may have contributed to this. First, large investment banks dominate the US repo markets. These institutions had no access to central bank credit and therefore came under particularly severe pressure when the financial turmoil intensified, with the result that they had to scale back their repo market activities more than most of the major European players. Second, prior to the turmoil, non-government bonds (particularly agency bonds, agency mortgage-backed securities and corporate bonds) played a more important role in the US repo market. After the onset of the turmoil, cash markets for such bonds dried up significantly, with the result that there was little possibility to use these bonds as collateral in repo markets. This led to considerable demand for – and a relative lack of – US Treasury bonds and an increase in the number of Treasury settlement failures around March 2008 and after Lehman Brothers' default. To mitigate these problems, the Federal Reserve introduced the Term Securities Lending Facility in March 2008. This facility allows counterparties to exchange certain less liquid securities for government bonds. Third, the Eurosystem has always accepted a broad range of assets (particularly non-government bonds) as collateral. Eurosystem counterparties have therefore been able to use less liquid assets as collateral in Eurosystem operations and keep their most liquid assets for use in the interbank repo market (see Box 2 below). In the United States, prior to the turmoil, most Federal Reserve

3 P. Hördahl and M. R. King, "Developments in repo markets during the financial turmoil", BIS Quarterly Review, December 2008.

operations required banks to use government bonds and other very liquid assets so that these assets could not be used in the repo market. This has changed, however, over the course of the turmoil, with the Federal Reserve' introduction of various new facilities for less liquid bonds.

MATURITIES

Anecdotal evidence originally suggested that the term money market segments (i.e. markets for transactions with a maturity of more than one day) have been hit harder by the turmoil than the overnight market. Indeed, term money markets were occasionally described by market participants as completely illiquid. This assessment was based mainly on the observation that, in the course of the turmoil, unsecured money market spreads have widened much more at the long end of the money market yield curve than at the short end.

However, according to the ECB's Money Market Survey, the average maturity of repo transactions with a maturity of up to one year increased from 6.6 days in the second quarter of 2007 to 7.2 days one year later and only then decreased to stand at 6.1 days in the second quarter of 2009. In the unsecured money market, the average maturities were 5.2 days, 6.2 days and 5.5 days over the same period. This contradicts, to some extent, the anecdotal evidence of shortening maturities.

This may be a reflection of: (i) banks' need to address the maturity structure of their liabilities; and (ii) central bank operations. Prior to the turmoil, many banks used to refinance long-term assets using short-term liabilities, which then had to be rolled over periodically. During the turmoil, however, this strategy has proved risky, as rolling over loans has not been as easy as it was before. As a consequence, demand for longer-term interbank funds has increased, despite the higher spreads that have to be paid for such funds, which led to an increase in average maturities in the interbank market in the first year of the turmoil, despite cash-rich banks' reluctance to lend funds for more than one week.

Following Lehman Brothers' default the Eurosystem began using fixed rate tender procedures with full allotment in all liquidity-providing operations, including longer-term refinancing operations with maturities of up to one year. This has allowed banks with sufficient amounts of eligible collateral to borrow any funds needed from the Eurosystem at the ECB's main refinancing rate. This measure has eliminated the rollover risk for most banks and may explain the reduction in average maturities from 2008 to 2009.

3 THE IMPACT OF THE TURMOIL ON DIFFERENT REPO MARKET SEGMENTS

GC AND SPECIAL REPOS

As described in Box 1, GC repos are used mainly to raise funds (i.e. they are cash-driven), while special repos are often securities-driven and part of short-selling strategies. With the onset of the turmoil, the funding motive has become more important, while short-selling has declined significantly. For example, GC repos' share of total repo turnover increased from 5% prior to the turmoil to almost 30% in the second quarter of 2009 for the three electronic repo trading platforms BrokerTec, MTS and Eurex Repo (see Chart 5).[4] Market participants also confirm that a smaller number of bonds have been "on special" since August 2007. This indicates that the reduction in repo market activity described in the previous section is not least a consequence of reduced short-selling activity. The turmoil may thus have led to a structural shift towards the funding motive in the repo market.

This finding should not come as a surprise, as two factors have played an important role in banks' strategy during the turmoil. First, as indicated, banks have had to deleverage. As a consequence, they have scaled down their short-selling. Second, banks have had to raise funds, and it has been difficult to obtain these with

4 Electronic trading platforms currently account for almost 30% of repos.

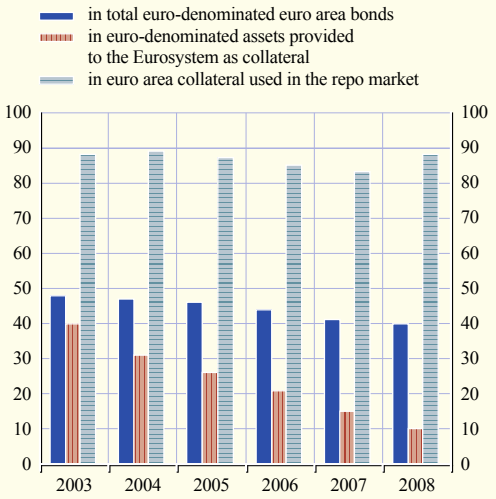
Chart 5 GC repos as a share of total euro repo turnover on electronic platforms

(percentages)

Sources: BrokerTec, MTS and Eurex Repo.
Note: Eurex Repo's GC Pooling is not included.

Chart 6 Share of euro-denominated euro area central government bonds

(percentage)



Sources: ICMA European Repo Market Surveys, ECB and ECB calculations.
Notes: Data on Eurosystem collateral refer to annual averages. All other data refer to the December of the relevant year.

acceptable conditions in the unsecured money market. GC repos have proved a relatively good alternative as long as it has been possible to use high-quality collateral. The repo market as a whole has contracted, but the GC repo market may, to some extent, have replaced the unsecured money market.

GOVERNMENT BOND REPOS VERSUS CREDIT REPOS

Any analysis of repo markets during the turmoil has to take into account the various types of asset that are used as collateral in the repo market. In principle, any type of security may be used. However, central government bonds account for the vast majority (80-90%) of repo collateral in Europe (see Chart 6). By way of comparison, only 40% of all outstanding euro-denominated bonds were euro area central government bonds in 2008. Interestingly, while government bonds' share of euro area bond markets as a whole (and specifically of the collateral provided to the Eurosystem) continued to decline from 2007 to 2008, this was not the case for the repo market, where central government bonds accounted for 83% of the market at the end of 2007 and 88% at the end of 2008. It is reasonable to assume that this trend towards the use of government bonds as collateral in repo markets reflects a flight to high-quality collateral in the wake of the increased tensions that followed Lehman Brothers' default. As the financial programmes introduced by governments in order to mitigate the recession and support the financial system led to more government bond issuance, and as banks may need to hold more government bonds as a liquidity buffer for the future, the share of government bonds in repo market collateral is likely to remain considerable in the coming years.

Other indications that the financial market turmoil has had an impact on the type of collateral used in the interbank repo market relate to the tri-party repo market. A tri-party repo is a repo where the cash lender and cash borrower outsource the collateral management to a specialist third party – the tri-party agent. The borrower and the lender agree on a basket of assets that can be used as collateral.

The tri-party agent then defines and updates the prices of the assets and determines the assets that will actually be used. It does so primarily with the aim of reducing the collateral costs of the borrower.

The share of illiquid assets is much larger for tri-party repos than for other repos between market participants. This is because tri-party agents specialise in the pricing of illiquid assets. Two of the major tri-party agents in Europe are Euroclear Bank and Clearstream Banking Luxembourg, the two international central securities depositories (ICSDs). As settlement institutions, the ICSDs can extract detailed information on asset prices from their own settlement data.

Indeed, structured securities such as asset-backed securities account for a substantial share of collateral in tri-party repos. However, as data from Clearstream Banking Luxembourg confirm, the turmoil reduced the share of structured securities from 35% in June 2007 to 25% in September 2007. Moreover, the share of government bonds in total tri-party repos reported for the ICMA European Repo Market Survey has increased from between 20% and 30% prior to the turmoil to 53% in June 2009. This may reflect the view, as expressed by many market participants, that it has been impossible (even for tri-party agents) to define adequate prices for structured securities and many other private sector papers. As a consequence, such assets have been used less often, being replaced by more liquid assets for which reliable market prices can be found.

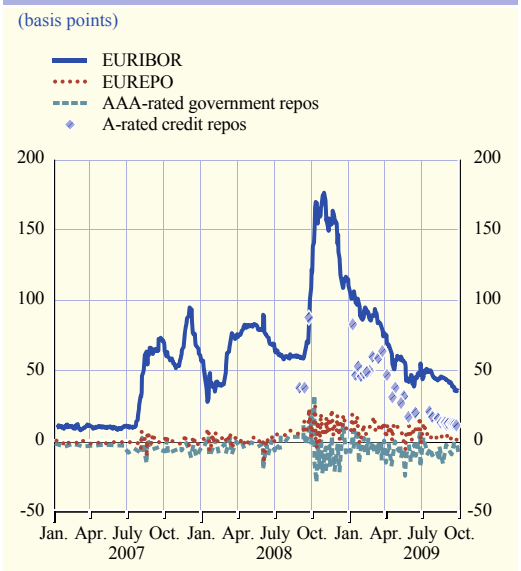
These interpretations are very much supported by developments in collateral haircuts for repos and developments in repo rate spreads for different types of collateral during the turmoil. Haircuts have increased for most asset classes, but particularly strong increases have been observed for structured securities, for which haircuts of up to 100% have been observed, meaning that these assets have no longer been able to be used as collateral.[5] Hedge funds and other unrated borrowers have been affected most, but even the haircuts required of major banks have increased significantly.

GC repo rate spreads for different types of collateral are displayed in Chart 7. As discussed above, EUREPO spreads have remained relatively close to zero for most of the turmoil to date, while EURIBOR spreads reached levels in excess of 150 basis points after Lehman Brothers' default. Spreads for A-rated credit repos[6] were, however, fairly close to EURIBOR spreads for several months following Lehman Brothers' default. The spreads observed for credit repos more closely resemble those seen for the EURIBOR than those recorded for the EUREPO.

These findings are consistent with developments observed in the collateral used in Eurosystem credit operations. Article 18.1 of the Statute of the ESCB requires that all credit provided by the Eurosystem be collateralised.

5 See, for example, Section 5 of the ECB publication "EU banks' funding structure and policies", May 2009.
6 Credit repos are collateralised using private sector securities rather than government bonds.

Chart 7 Spreads vis-à-vis OIS rates at the three-month maturity



Sources: Thomson Reuters, European Banking Federation and JPMorgan (for credit repo rates).
Note: Rates for A-rated credit repos are available only for infrequent snapshot dates prior to August 2009.

The Eurosystem accepts a broad range of assets as collateral, including central and regional government bonds, corporate and covered and uncovered bank bonds, asset-backed securities and non-marketable assets, such as credit claims (i.e. bank loans). In October and November 2008 the Eurosystem further extended, on a temporary basis, the list of assets eligible for use as collateral in order to complement the policy of full allotment at a fixed rate applied in all open market operations since then.[7] Assets need to fulfil a set of criteria in order to be eligible for use in Eurosystem operations. These criteria can be found in the ECB's General Documentation.[8] A list of all marketable eligible assets is published on the ECB's website. The decision as to which assets on that list a credit institution uses to collateralise credit provided by the Eurosystem is largely at the discretion of the relevant credit institution.[9]

As Chart 6 shows, the share of central government bonds in the assets used as collateral in Eurosystem operations has declined continuously over the past six years. Moreover, the share of structured securities has been increasing, particularly since the start of the turmoil. Thus, the trend observed in the composition of collateral deposited with the Eurosystem is the opposite of that observed for collateral in repo markets. A discussion of this observation is provided in Box 2 below.

7 See the ECB press releases of 15 October 2008 and 7 May 2009. Assets that have been eligible since October and November 2008 include marketable debt instruments denominated in US dollars, pounds sterling and Japanese yen, as well as assets with a rating between A- and BBB-.

8 General Documentation on Eurosystem monetary policy instruments and procedures, November 2008.

9 The Eurosystem applies collateral concentration limits to the use of uncovered bank bonds and does not allow a credit institution to use assets as collateral if the credit institution has "close links" with the issuer of those assets.

Box 2

THE USE OF COLLATERAL IN REPO MARKETS AND EUROSYSTEM CREDIT OPERATIONS

The question of which assets are used as collateral in repo transactions between private parties is – like the haircuts and the repo rate – a matter for negotiation. In principle, the two parties can agree on any transferable assets. However, in most cases only very liquid assets (particularly central government bonds) are used.

Why are less liquid assets, such as corporate bonds and asset-backed securities, hardly ever used? It may be argued that these imply a lower level of protection for the cash lender. Illiquid assets are difficult to mark to market, so valuation mistakes over the life of the repo are likely. And even if the assets have been valued correctly, the liquidation price of illiquid assets may be much lower than the previous market price. If the borrower defaults, therefore, the lender may be able to sell illiquid collateral assets only at a loss.

However, this line of argument is incomplete, as larger haircuts can be applied to illiquid assets to ensure that the lender is not less protected than it would be if central government bonds were used as collateral. It is not necessarily true, therefore, that illiquid assets imply a lower level of protection for the lender.

To complete this line of argument, it should be noted that the borrower may not be prepared to accept large haircuts, as these imply additional costs for the borrower in terms of collateral. But what are the costs of highly illiquid collateral such as asset-backed securities?

In this context, it is important to bear in mind that the borrower is not the only party that could default. The lender could, of course, also default. If the lender in a repo transaction defaults, the collateral will not usually be returned to the borrower. The repo will be terminated when the default is announced and the collateral will be valued. If the value of the collateral exceeds the cash value, the borrower will keep the cash, but will still have a net claim on the lender, which may be lost in part or in full. The expected net claim – and thus the potential losses – will be larger when the haircuts are large. As a consequence, the borrower will be reluctant to accept large haircuts. Thus, the additional expected losses that stem from accepting larger haircuts can be interpreted as collateral costs.[1]

As a consequence, the borrower may wish to provide illiquid assets as collateral, provided that the lender accepts small haircuts. However, small haircuts on illiquid collateral will not normally be acceptable to the lender. The two parties will therefore agree to first employ the most liquid assets as collateral, with relatively small haircuts. Less liquid assets will be used only if the borrower does not have any more liquid assets available.

This explanation for the large share of central government bonds in repo market collateral is based on the assumption that there is a chance of the cash lender defaulting. If the lender cannot default, the borrower might be less reluctant to accept large haircuts on less liquid assets. This leads to the conclusion that banks may prefer to use less liquid assets as collateral with the central bank, an institution that will hardly ever default, even if central bank haircuts on such assets are relatively large. In addition, this strategy allows banks to save more liquid assets for their borrowing activities in the private repo market.

1 For a more detailed discussion, see C. Ewerhart and J. Tapking, "Repo markets, counterparty risk and the 2007/2008 liquidity crisis", ECB Working Paper No 909, 2008.

Finally, referring back to Chart 7, it should be noted that government bond repo spreads during the turmoil have been very much dependent on the issuing government, particularly in the first two quarters of 2009. It was at this time that the yield spreads of euro area government bonds vis-à-vis German government bonds widened significantly as the creditworthiness of some euro area governments was occasionally questioned by market participants as a consequence of significant government intervention. As Chart 7 shows, AAA-rated government bond repo spreads were lower than EUREPO spreads during that period. As described above, EUREPO rates relate to GC repo transactions with euro area government bonds as collateral, including bonds rated below AAA. AAA-rated government bond repo spreads declined somewhat at the peak of the turmoil and reached negative levels, indicating considerable demand for such papers in the repo market at that time and reflecting the perception that even overnight unsecured lending involved some degree of credit risk.

CENTRAL COUNTERPARTY CLEARING

An important strategy with a view to mitigating some of the risks stemming from repo transactions is the use of central counterparty clearing houses (CCPs). CCPs are institutions that offer what is called "novation": once two parties have concluded a repo trade, the CCP steps in between them and the original repo trade is replaced by two new transactions – one between the cash borrower and the CCP (in which the CCP receives collateral from and lends funds to the cash borrower), and one between the CCP and the cash lender (in which the CCP provides collateral to and receives funds from the cash lender). Even if one party to the original transaction fails to fulfil its obligations

(i.e. its obligations towards the CCP), the other party will still not suffer any loss, as the transaction between that second party and the CCP will still be settled. Only if the CCP fails to fulfil its obligations will non-defaulting parties potentially suffer losses. This, however, is very unlikely, as CCPs are very safe institutions that apply strict risk management measures.

For the cash lender, CCP clearing is attractive in principle if there is a significant risk of both the cash borrower defaulting and the cash value of the repo transaction (including interest) exceeding the liquidation value of the collateral (measured, for example, by the bid price) at the moment of default. For the cash borrower, CCP clearing is attractive if there is a significant risk of both the cash lender defaulting and the collateral's repurchase value (measured, for example, by the ask price) exceeding the cash value. Thus, it is conceivable that the share of repos cleared through a CCP will increase when both: (i) the probability of default increases; and (ii) collateral assets become more illiquid.[10] As a consequence of the financial turmoil, market participants have a strong incentive to reduce credit risk in their operations through increased recourse to CCP clearing, and regulation is being considered in Europe and the United States to channel standardised over-the-counter transactions into CCP clearing.

The ICMA European Repo Market Survey provides data on the percentage of repos traded (anonymously) in an electronic trading system and cleared in a CCP. These accounted for between 9% and 15% of repo trades in the four surveys prior to the turmoil and between 10% and 18% during the turmoil to date, with a peak of 18% observed in December 2008 following Lehman Brothers' default. Since June 2008 the ICMA survey has also provided data on the percentage of repos cleared in a CCP, including non-electronic repos. This was at 24% in June 2008, had increased to 33% by December 2008 and stood at 32% in June 2009. Thus, these data confirm that CCP clearing has increased somewhat during the turmoil as a consequence of heightened concerns regarding counterparty credit risk, which has also affected the repo market.

4 SUMMARY AND OUTLOOK

Two main trends have characterised the euro repo market during the financial market turmoil: a flight to quality and the growing importance of the funding motive. That flight to quality can be seen in both the increased share of government bonds in the collateral employed in repo markets and the greater use of CCPs. The fact that GC repos have increased relative to special repos indicates that the repo market is increasingly being used as a funding market and may have replaced some activities in the unsecured money market. Nevertheless, the repo market has clearly suffered as a result of the turmoil.

The interrelationship between Eurosystem monetary policy operations and repo markets has become pronounced during the turmoil. On the one hand, the increases in the volume of monetary policy operations have led to those operations replacing some interbank repos and thus have had a negative impact on turnover. On the other hand, the fact that the Eurosystem accepts a very broad range of assets as collateral in its operations has helped to improve the availability of high-quality collateral in the interbank repo market.

An important question concerns the extent to which the repo market trends triggered by the turmoil will be reversed following the end of the turmoil. It may be that non-government bonds regain their important role as collateral when

10 Price volatility might play a less important role than the liquidity of assets, as frequent marking to market and margin calls should ensure that the collateral value as measured by the mid-price (i.e. the average of the bid price and the ask price) is always very close to the cash value.

they become sufficiently liquid. However, the requirements regarding the liquidity of assets employed as collateral in interbank repos may become more demanding in the future. Similarly, banks may soon return to short-selling strategies. However, given their advantages as regards banks' credit and liquidity risk management, it may be that repos are used more for funding purposes than was the case prior to August 2007. Indeed, the repo market may be one of those markets that gain in importance in the medium term as a result of the turmoil.