

CLOSED FOR BUSINESS

**A post-mortem of the European repo market
break-down over the 2016 year-end**

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Introduction

The extreme volatility and market dislocation experienced in the euro repo market¹ over the 2016 year-end are unprecedented in the post-euro era. This has raised concerns over whether this was a one-off event, or rather this is an indication of a market that no longer functions efficiently and effectively under stressed conditions, and signals a new normal for the European short-term funding and collateral markets. This report, based on available market data and interviews with market participants (including repo market-makers, buy-side firms, and infrastructure providers), attempts to document the market moves and behaviour in the final week of December of 2016. More specifically it seeks to answer: (i) what happened? (ii) why it happened? and (iii) what possible measures can be taken to avoid future extreme dislocation?

What happened?

Early warning

Year-end effects are nothing new in the repo and short-term funding markets. Banks and other liquidity providers generally reduce their activity over the calendar year-end (which in many jurisdictions is also financial year-end), primarily due to reporting or statement date obligations, and so markets tend to be thin and therefore more volatile. As more banks have fallen under the regulatory reporting obligations related to Basel III (in particular, Liquidity Coverage Ratio and Leverage Ratio), these liquidity effects have become more frequent, and more pronounced, particularly around month and quarter-ends. Accordingly, the market had been anticipating a difficult 2016 year-end well in advance. A number of buy-side firms report having conversations with their dealer banks about locking in their year-end funding requirements as early as September. As one asset manager explained, you did not want to be calling your bank for year-end quotes in December. It would seem that for the most part, many buy-side firms did lock-in their funding and collateral management needs early, to the extent that it was practical to do so. But as one asset manager also explained, if you can 'square-away' 80% of your anticipated needs early, you have done well, but it is impossible to know your precise year-end requirements until you reach the final few days before. It also has to be remembered that UCITS-regulated money market funds are restricted to 7-day investments. Meanwhile, funds managing large derivatives books need the daily flexibility to access the repo market to meet margin calls.

Approaching the turn

As year-end approached, dealers and fund managers report that the 'turn' (i.e. the three-calendar day period that straddles year-end) was becoming more expensive in terms of borrowing HQLA. In the case of German government bonds, the most sought after HQLA, the implied repo rate was around -2%, compared with normal spot-next² and tom-next³ levels of around -0.65% to -0.70%. However, the market remained relatively stable. Even in the week leading up to the December 25 holiday, general collateral (GC) and specials rates⁴ began to tighten, but not to any alarming degree. It was not until December 28, when the actual year-end date (December 30) became the 'spot' settlement date that the market broke-down.

Specials

Despite the euro government bond market moving to a standardized settlement date of T+2⁵ in October 2014, the most liquid settlement date for the repo market has become bifurcated between T+2 and T+1, with the specials market largely trading on a T+2 basis.⁶ On the morning of December 28, spot-next repo rates for German specials in the interbank began to gap as it became clear that there were very few offers. Many specials opened-up around -4% (compared to a recent norm of around -1%), and as offers were lifted, rates quickly moved 'tighter' (i.e. lower) to around -6% to -7%. These moves were mirrored in the specials markets for other 'core' sovereign bonds, including

1 It should be noted that similar dislocations were experienced in the sterling repo and short-term funding markets, and largely for similar reasons; however, the extent of the dislocations and price volatility was not as severe as that of the euro markets.

2 Spot-next is a one-day repo with the first leg settling two days after trade date ('spot') and the second leg settling three days after trade day (i.e. the next day). Spot-next and tom-next are the most popular traded terms for euro repo markets.

3 Tom-next is a one-day repo with the first leg settling one day after trade date (literally, tomorrow) and the second leg settling two days after trade day (i.e. the next day). Spot-next and tom-next are the most popular traded terms for euro repo markets.

4 'Specials' (also called 'specifics') are repo markets for individual securities, rather than baskets or classes of securities. Special rates are usually at a premium to (i.e. lower than) general collateral rates. The degree of specialness (i.e. the GC-special spread) is closely correlated to the relative 'expensiveness' of the underlying security and/or determined by the repo demand and supply for the security.

5 'T+2' settlement denotes settlement two days after trade date (i.e. spot). Prior to an EU regulatory change in 2015, related to non-OTC transactions, standard market settlement for most European government bond markets was T+3 (also known as 'corporate' settlement).

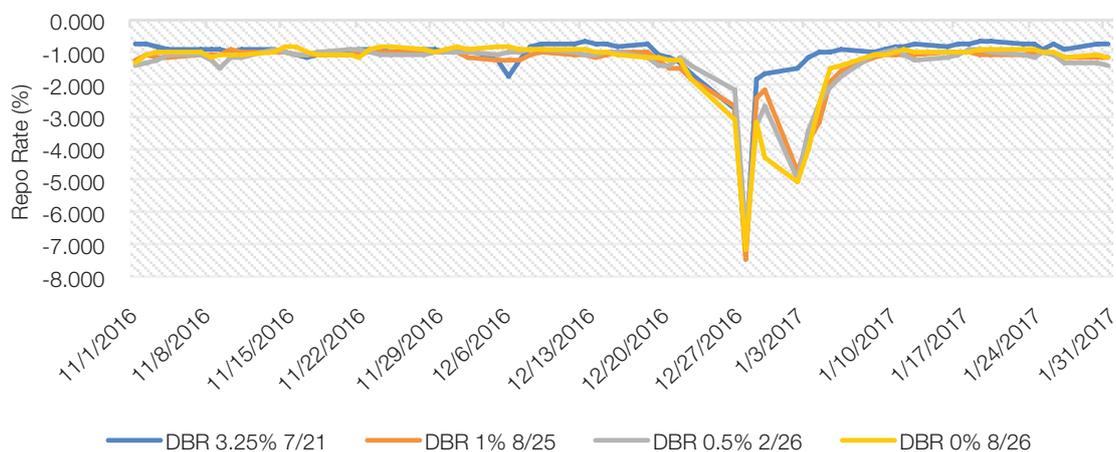
6 There is no standardized settlement date for securities financing transactions, however, the most liquid settlement date for SFTs is usually one day shorter than the standard or most liquid settlement date for the underlying security. This is due to the fact that SFT traders and collateral managers do not know their collateral positions with certainty until the close of trading on any given day.

France, Belgium, The Netherlands, and Austria. There are numerous examples of extreme 'prints' across all the markets, but DSL 3.25 7/21⁷ trading spot-next at -15% illustrates the extent of the inter-dealer market dislocation, while there are anecdotal reports of dealer-to-client transactions in specific ISINs printing as tight as -20%.

GC

While most year-end specials trading seems to have taken place on December 28, the vast majority of general collateral financing took place in the tom-next market on December 29. In the GC market lenders of collateral are looking to borrow cash on a secured basis, while borrowers of collateral are looking to place their cash against receiving collateral (primarily HQLA). As with specials rates the previous days, it soon became clear that the market was short of collateral, particularly HQLA, and GC rates quickly gapped. The weighted average rate for German tom-next GC traded on BrokerTec was close to -8%, with a low print of -9%. French GC also averaged around -8%. Such was the dislocation that dealers quickly began to scour the screens for offers in specials that were cheaper than the prevailing GC rates, while banks that traditionally could only take German collateral as HQLA quickly relaxed their policy in favour of other core sovereign credits.

Figure 1: German specials rates



Source: Nex Data Services Limited (BrokerTec)

Non-core markets

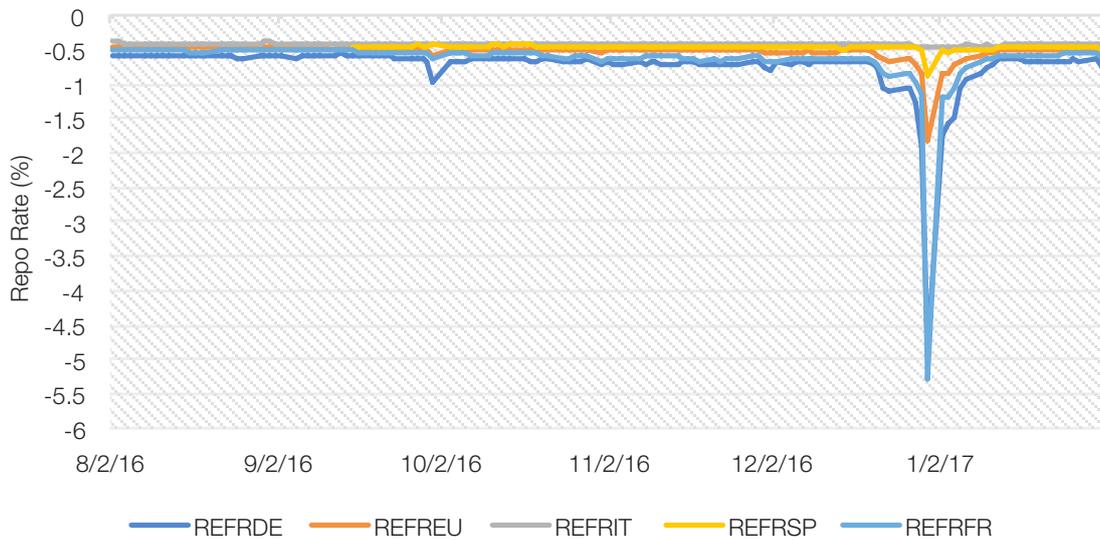
While not as pronounced, the extreme tightness in core GC and specials did spill over into non-core rates. Spanish GC, for instance, which normally trades close to Eonia, tightened to almost -1%. Meanwhile, Italian GC rates, which normally cheapen over year-end, remained around the same level (close to Eonia).

How the buy-side managed

What becomes clear is that while banks and their clients were primed for a particularly difficult year-end, even months in advance, there is only so much market participants can do to mitigate their year-end exposure. As one fund manager described the experience, "It was like watching a train smash in slow motion; you could see it happening, but could do nothing about it". Banks were already allocating their limited balance sheets and squaring their books as early as October, while many buy-side firms (real money and leveraged) required the flexibility to manage their liquidity and collateral right up until the day before the turn. It would seem that some buy-side firms were able to leverage bank relationships and negotiate some last-minute repo liquidity, albeit at a cost. Others, unable to access the repo market, could only resort to buying short-term assets, such as T-bills, at distorted levels, only to sell them again a few days later at much cheaper levels, as well as paying an inflated bid-ask spread.

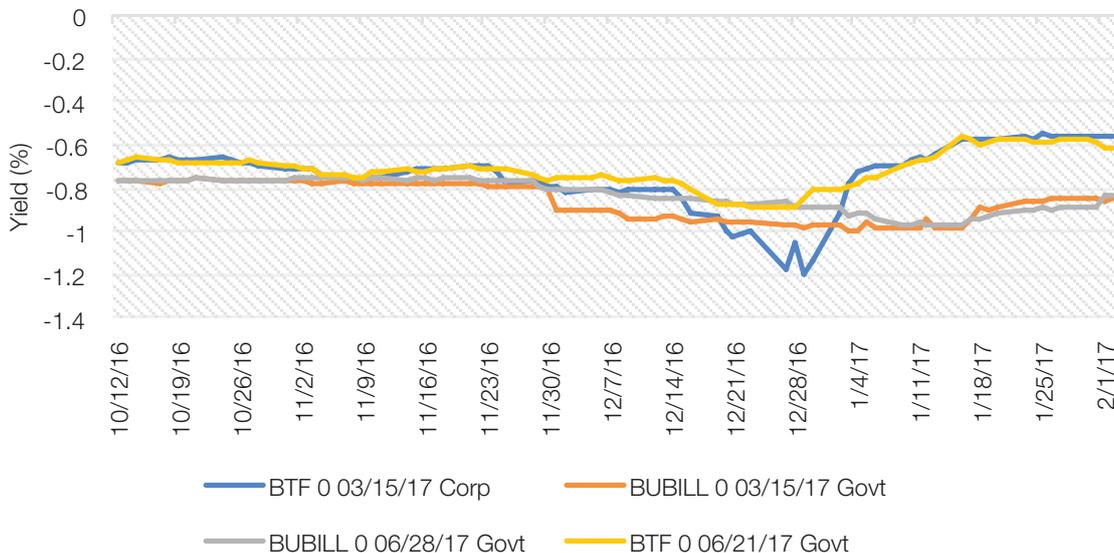
⁷ Dutch State Loan, 3.25%, maturing July 2021.

Figure 2: Euro GC rates⁸



Source: Bloomberg

Figure 3: T-bill rates



Source: Bloomberg

Settlement efficiency and fails

Despite the significant dislocations in rates, preliminary analysis suggests that settlement fails did not notably increase over year-end, which has been anecdotally corroborated by both market participants and clearing houses. To some extent, the fact that dealers and clients were willing to pay such deeply negative rates indicates a strong reluctance to fail (which would also have capital cost implications). A number of dealers noted that it was fortunate that the projected EU mandatory buy-in regime had not already been implemented, as this would have most likely accentuated the observed dislocations, and, somewhat counterintuitively, actually increased the incidence of fails.⁹

⁸ The Repo Funds Rate (RFR) is a daily euro repo index calculated from trades executed on the BrokerTec and MTS electronic platforms. All eligible repo trades are centrally cleared and RFR Euro is calculated and published by Nex Data Services Limited. RFR Euro is calculated with repo trades that use sovereign government bonds issued by any country in the Eurozone.

⁹ The likely counterproductive impacts to market liquidity and settlement efficiency have been well documented since the regulatory initiative was first proposed (e.g. ICMA, 2015, 'Impact study for CSDR mandatory buy-ins')

Why did it happen?

The interviews strongly support the argument that the year-end break-down was the result of a perfect storm driven by three key factors: (i) market positioning; (ii) the effects of quantitative easing (compounded by an inadequate lending program); and (iii) regulatory impacts on bank intermediation.

Positioning – short bonds

Participants report that in the final weeks of 2016 there was a significant increase in the shorting of core euro government bonds, both as outright directional trades and as basis trades.¹⁰ Some respondents note that as cash bonds began to look expensive relative to futures, they also saw an uptick in switching out of short futures hedges into short cash hedges. This short-selling, both from dealers and leveraged funds, increased repo demand going into year-end. While many hedge funds locked in their year-end repos some weeks in advance, it would seem that a significant amount of overnight short-covering rolled into the turn.

Positioning – the currency basis

Another key consideration is the fact that structurally European banks are very long of euros (primarily as result of ECB monetary policy) and short of dollars. This is reflected in the EUR-USD currency basis swap, which makes borrowing USD relatively more expensive than borrowing EUR.¹¹ As year-end approached this basis began to move significantly, as banks struggled to lend their euros and borrow offshore dollars. As the basis moved more negative, so the implied funding cost of euros moved lower and lower. Any entity that was fortunate enough to be long dollars and able to swap these into euros found themselves borrowing euros at deep negative rates, which could be highly profitable so long as they could invest in short-term euro assets, so putting further downward pressure on short-term euro rates. It has been reported that at one point on December 29 it was possible to swap year-end dollars into euros at a rate of -25%. Under these conditions, paying -8% for German GC looks like a bargain. However, the ability to swap dollars to invest in non-dollar assets can be restricted. The recent money market reforms in the US, for instance, restrict this. Furthermore, holders of dollars also need access to banks who can provide them with a currency swap, and many banks were unable or unwilling to provide this liquidity.

Figure 4: EUR-USD currency basis swap



Source: Bloomberg

¹⁰ A government bond basis trade entails buying or shorting a cash bond against shorting or buying a futures position. Shorting the basis means selling the bond and buying the future, with a view that the cash bond will cheapen relative to the future. This transaction also entails borrowing the cash bond.

¹¹ Interest rate parity theory suggests that the foreign exchange forwards markets will always ensure that the relative LIBOR cost of borrowing in any currency will be the same. However, it can often be cheaper to borrow in one currency through the FX forwards. The currency basis swap reflects this relative disparity. Basis swaps are usually expressed as one currency against the USD, and a negative basis suggests a relative cheapness to borrow in that currency with respect to USD.

Quantitative easing

By the end of 2016, the ECB's Public Sector Purchase Programme (PSPP) had absorbed over €1.2 trillion of euro government bonds, of which over €300 billion being German government bonds (around 27% of total outstandings), and €240 billion French government bonds (around 15% of total outstandings). This has precipitated a slight premium in German and French GC rates relative to other Eurozone sovereign markets (by around 20bp and 15bp respectively) while both increasing the number and relative spread of German specials.

In theory, so long as PSPP holdings are made readily available through the repo or securities lending markets, collateral shortages and extreme specialness should be largely mitigated. Of course, a like-for-like, collateral-versus-collateral lending scheme does not help in terms of overall collateral scarcity, but this was partly addressed with the ECB's introduction of a bond-versus-cash repo facility in early December 2016. However, participants suggest that even this initiative did not help with year-end pressures, and may even have contributed to the break-down. A number of participants cite the fact that with respect to sourcing German government bonds, the primary source was the Bundesbank (rather than the ECB, who only holds around 10% of the overall PSPP purchases). This requires counterparties having a credit line with the Bundesbank as well as being party to the less used European Master Agreement (EMA), as opposed to the more ubiquitous, market-standard GMRA or GMSLA repo and lending agreements. A further complication is that at the time there was no ability to pair-off rolling borrows or reverses. In other words, at the end of the term of the borrow, the counterparty was forced to deliver the securities back to the central bank before they could renew the borrow. And in the event of failing, the penalties are highly punitive, both economically and reputationally. As one dealer stated, on balance it was preferable to fail to your best client rather than to go to the Bundesbank. A number of dealers also point to the fact that while the ECB's repo facility was set at a fixed rate of the ECB Deposit Rate less 30bp (i.e. -0.70%), the central bank lending facilities failed to provide a floor for the market. Dealers explained how the lending rates for German government bonds effectively tracked the market, with offers moving lower each time the broker screens were lifted, rather than standing firm and providing a floor for a market in freefall.

Regulation

It is now a well-established reality of the post-Basel III era that banks are forced to reduce their trading activity and liquidity provision around month-end reporting dates particularly quarter-end, and critically at year-end. There is a pattern of reduced liquidity and volatile repo rates from the initial adoption of LCR requirements by some banks in 2011/12, and which have become compounded since the introduction of Leverage Ratio constraints across various jurisdictions. The bottom line is that as banks reach critical reporting dates, they effectively shrink their balance sheets, and close for business. This is equally true for unsecured activity (short-term lending/deposits or FX-swaps) as for secured lending. For these markets, the Leverage Ratio is the binding constraint on activity; and for high volume, low return businesses such as government bond repo, it is more a deterrent than a constraint.

Dealers explained how they were unable to provide balance sheet and make prices to clients over year-end, while fund managers related stories of relationships being levered and favours being pulled to avoid being stranded over year-end. As one major blue-chip fund manager pointed out, the inability to get a repo quote on December 29, at any rate, would have technically put them in default.

The existence of bank levies in a number of European jurisdictions (and even an additional tax on non-bank secured funding in one jurisdiction), which are based on year-end snapshots of balance sheet, have also been cited as potential factors leading many banks closing their repo books. However, it is difficult to find either anecdotal or statistical evidence to corroborate this.

Other considerations

The non-centralized and fragmented lending schemes of the ECB and the various NCBs, intended to ameliorate the supply shocks of the PSPP, have long been cited as problematic, and in most cases they are not viewed as an easily accessible source of bonds. However, there are also other key providers of repo supply to the market, particularly for German government bonds; namely non-European sovereign wealth funds. Several dealers explained how these funds have far more influence on repo liquidity and rates than the ECB or Bundesbank. These impacts can be felt (and observed) over key local holidays, when they too close their books and cease lending, and this was likely also an additional key contributing factor in the 2016 year-end break-down.

A key question in any analysis is why did banks not step in to take advantage of the dislocations? When the implied euro rates from the currency basis are at -20%, and euro GC is at -10%, the potential returns of swapping dollars to buy euro repo should more than cover the regulatory cost of applying balance sheet to arbitraging these dislocations. The exploiting of such arbitrage opportunities is a critical element of market efficiency and helps limit extreme price dislocations. However, arbitrage price efficiency models rely on an assumption of risk neutrality, and what becomes clear from discussions with repo dealers is that we are far from a risk neutral market, and are in fact in a highly risk averse environment. The incentives to profit from price dislocations and arbitrage opportunities no longer exist, particularly in the repo market, and we have lost the culture of a 'traded' market. As one dealer reported, "I told my team to square up and go home; nobody gets paid for taking risk". And while there are plenty of non-banks who would probably jump all over such opportunities, they would have required bank intermediation to provide them with either repo or swap liquidity and leverage; and, as already highlighted, that was not available.

Possible measures to avoid future dislocations

Not surprisingly, there is a concern that the market break-down over year-end was not an isolated incident, and that this is a sign of things to come, with future quarter-ends, and perhaps even month-ends, also experiencing extreme price and liquidity dislocations. Effectively, the 2016 year-end could be heralding a new 'normal' for the European repo markets. It is notable that in January both GC and specials rates had not fully reverted to pre-year-end levels. It further raises questions about how well the repo market could cope under stressed market conditions (remembering that previously it functioned efficiently through both the 2008 Lehman default and the 2011/12 sovereign crisis). An important part of this analysis is therefore to draw on 'lessons learned' from market participants to suggest potential market or regulatory initiatives that could help avoid future extreme dislocations, and ensure a robust and functioning Eurozone market for repo and collateral.

Further improvements in the ECB/NCB lending schemes

It was noted that the ECB and Bundesbank had already gone some way to making their lending programs more user friendly following market feedback after the year-end break-down. However, many feel that a lot more could be done, particularly as the PSPP is set to run throughout 2017. In particular, a centrally coordinated program, using standardized legal agreements (GMRA and or GMSLA), harmonized features (dates, rates, haircuts, roll-over capacity), and a broader schedule of collateral (including non-sovereign bonds), for many, was the obvious recommendation. A further suggestion is ensuring that there is an adequate supply of stock, in particular German and French government bonds, available across both ICSD auto-borrow facilities, which will also help to provide a floor for borrowing costs.

Bank dis-intermediation by the market

A number of nascent initiatives already exist to facilitate 'all-to-all' (or more specifically 'client-to-client') repo or securities lending solutions. However, the barriers remain high. Many buy-side firms do not have the capacity to perform ongoing due-diligence credit risk management with multiple non-bank counterparties, and in most cases are not in a position to even justify a line. Negotiating multiple bilateral repo or lending legal agreements is also prohibitively onerous. Timing, diversity of interests, and capacity to price and manage risk also make it difficult to replace the immediacy provided by the bank repo market-making model.

Bank dis-intermediation by the ECB

CCPs already have some access to central bank deposit facilities, thus negating reliance on the repo market to invest their (not insignificant) initial margin cash balances. This raises the question of whether money market funds, and other non-bank investment firms, should also have access to central bank deposit or repo facilities (similar to in the US¹²).

Client central-clearing

Central clearing for repo provides banks with greater opportunity for balance sheet netting; however, CCP membership is currently restricted to the interbank market. Extending central -clearing to buy-side firms would enhance the capacity

¹² The Federal Reserve's overnight reverse repo facility (ON RRP) allows a wide range of financial institutions (such as money market funds and agencies) to lend money on an overnight basis to the central bank.

for banks to provide an intermediation service to other members. However, while a number of client-clearing initiatives are currently being floated, access to CCPs is likely to remain limited to only the largest non-bank entities due to the high barriers to entry.

More robust ex-ante impact analysis for potential future regulatory initiatives

A number of regulatory initiatives are either in the process of being implemented, or considered, which are designed, directly or indirectly, to restrict collateral fluidity and the ability of banks to intermediate in repo and collateral markets. Among these are the Net Stable Funding Ratio, which will create a long-term funding requirement for match-funded short-term repo transactions with banks and other financial institutions, and CSDR mandatory buy-ins, which enforces a mandated buy-in obligation in the event of settlement fails, and so creates a dis-incentive to lending securities. Other touted initiatives that will inhibit repo market efficiency and collateral fluidity include mandatory haircuts for SFTs and limits on collateral 're-use'. Furthermore, these initiatives come at a time when mandatory clearing and margin obligations for non-cleared trades will increase the need for immediacy and fluidity in the repo and collateral markets.

Regulatory support for repo intermediation

There is an element of contradiction in that while we create a financial system that becomes ever more dependent on the requirement and ability to post collateral, we are introducing regulatory initiatives that dis-incentivize the intermediation and fluidity of collateral through the repo market. The single biggest inhibitor is the Leverage Ratio. Given the importance of collateral and collateral fluidity, an exemption of, or less stringent treatment for, SFTs for HQLA collateral could help smooth potential demand-supply imbalances by revitalizing the intermediation function of bank repo desks.

A suggestion discussed by some firms is a move to daily average reporting for LR, LCR, levies, etc., which could help smooth the current illiquidity spikes around reporting dates (noting that a number of banks, in particular the US regulated banks, already use daily averaging). However, the general view is that while this should go some way to limiting the extreme volatility observed over the 2016 year-end, the net impact would be to reduce overall balance sheet capacity throughout the year, and not just over current reporting dates.

Conclusion

The volatility and dislocations in the euro repo market over the 2016 year-end, while to an extent anticipated, were unprecedented in their severity. It is reasonable to conclude that at the end of December, the euro repo and short-term funding markets effectively broke-down, something that did not happen either during the Lehman crisis or over the sovereign bond crisis. The factors driving this break-down are multiple, and very much acted in confluence to precipitate the perfect storm. A shortage of readily available HQLA as a result of quantitative easing and the reluctance, or lack of capacity, of banks to provide year-end funding liquidity are key contributors, while market positioning, both in government bonds and currency basis, accentuated the pressures. As the ECB's bond purchase programs are set to continue, and as more regulation puts pressure on banks' balance sheet and intermediation capacity, there is a very real concern that the market behaviour over the 2016 year-end is not a 'one-off' event, and could herald the start of a new normal. This could heighten risks related to banks' and firms' ability to meet margin calls, which in turn could have systemic consequences.

It seems unlikely that one single solution, either by regulatory or monetary policy makers, will provide a quick fix; rather it is likely to require a number of measures as well as more rigorous, ongoing analysis of the possible impacts of various policies, in order to ensure the smooth and efficient functioning of the European funding and collateral markets.

ICMA European Repo and Collateral Council (ERCC)

Since the early 1990's, ICMA has played a significant role in promoting the interests and activities of the international repo market, and of the product itself.

The ICMA European Repo Council (ERC) was established in December 1999, to represent the cross-border repo market in Europe. It has become the industry representative body that develops consensus solutions to issues arising in a rapidly evolving marketplace, consolidating and **codifying best market practice**. The Council's on-going efforts to establish a robust infrastructure to underpin the European repo market include the development of the **Global Master Repurchase Agreement (GMRA)** and the publication of the **ICMA ERC Guide to Best Practice in the European Repo Market** – a document which is periodically amended as warranted by evolution in the agreed understanding of best practice. The Council also plays a significant role in nurturing the development of the repo market and supporting its wider use in Europe by providing educational courses and market information, such as the **bi-annual survey of the European repo market** which has become established over the past decade as the only authoritative indicator of market size and structure and the dominant trends.

On 4 December 2015, ICMA's board decided to change the name of the European Repo Council (ERC) to the European Repo and Collateral Council (ERCC). This change was made in order to recognise the increasingly intimate relationship between repo and collateral and the substantial focus of the ERC on collateral. The repo market is the main means by which collateral is sourced, priced and circulated. Repo desks are increasingly regarded as collateral desks. Moreover, since the financial crisis of 2007, the importance of collateral has grown significantly and the ERC has increasingly focused its efforts on working with the authorities to create an efficient collateral market. While the name change is not expected to presage a dramatic shift in the nature or role of the ICMA ERCC, it will serve to sharpen the focus of the ICMA ERCC on collateral and will also help to ensure that there is recognition in the official sector, and amongst the public, of the ERCC's mandate to work on collateral. The ERCC's work will continue as today, but over time new groups of member representatives may be formed to more directly tackle applicable collateral topics and challenges.

Membership of the ERCC is open to ICMA members who transact repo business in Europe. For more information contact: ercc@icmagroup.org



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