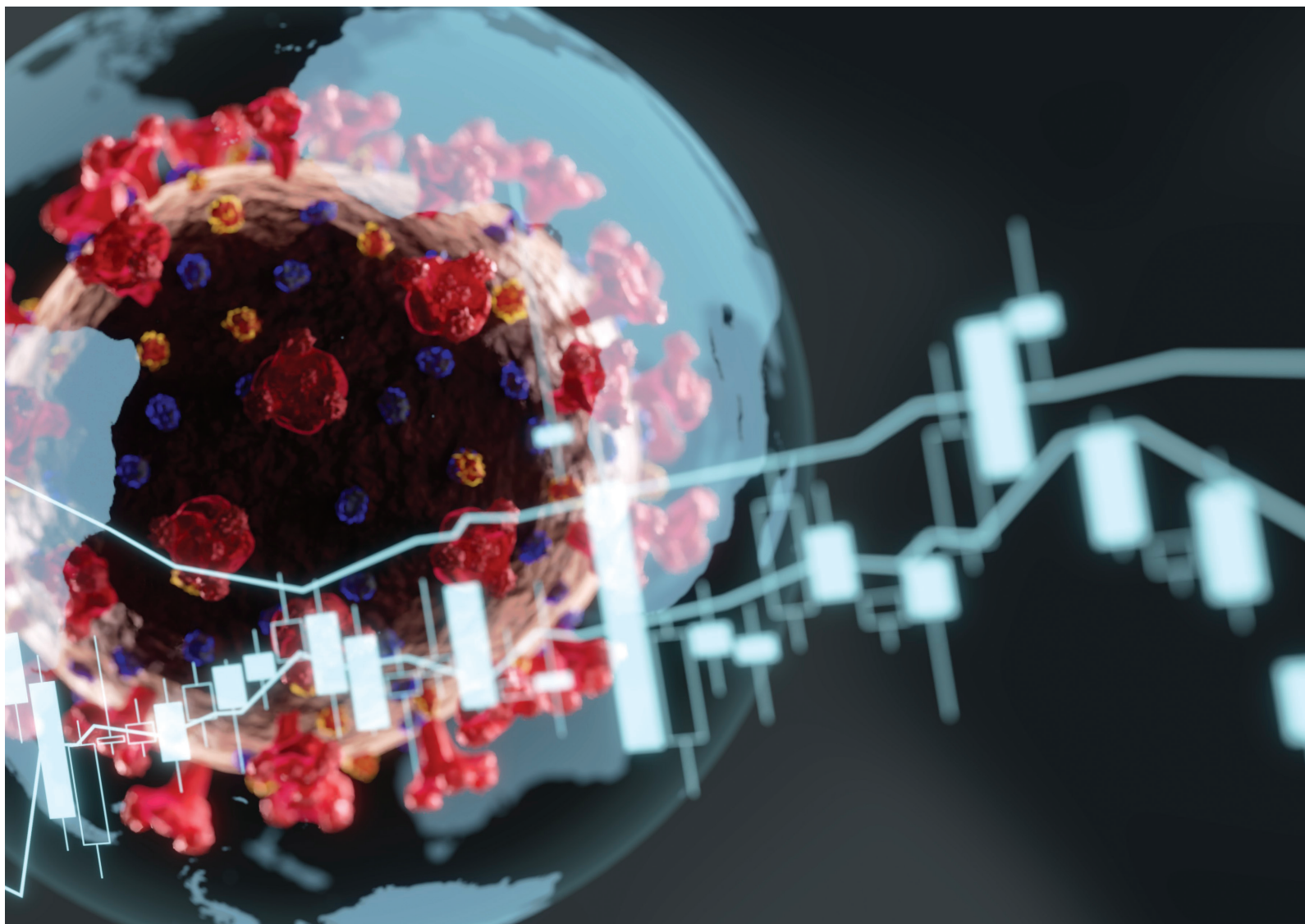


Covid-19: Pandemic risk

Special report 2020

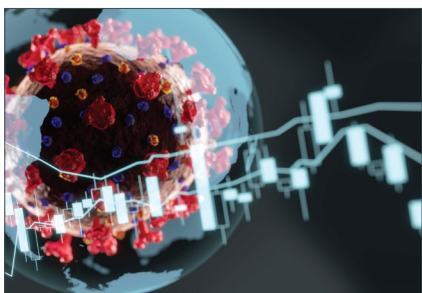
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Don't let a good crisis go to waste

In the aftermath of the financial crisis, regulators scratching their heads on how to prevent a repeat were in the early days of beefing up what would become a tough battery of annual stress-testing programmes – and a row broke out between one central bank and its prudential supervisory arm.

There was broad agreement that stress scenarios made sense as a means of getting banks to think about what would happen if an unlikely confluence of events led to another far-reaching, long-lasting crisis. The problem came when the question of how severe to make these scenarios arose, recalls one seasoned former regulator at the prudential watchdog – still the subject of endless rows between banks and regulators, and policy-makers themselves.

The central bank's economists were pushing the regulator to make its stress scenarios countercyclical, recalls the veteran supervisor; the country was already mired in its deepest post-war recession, they argued, and surely things couldn't get any worse – so why make the stress tests any more punitive for the country's ailing banks than they needed to be?

Reluctant to call the bottom of the cycle, the regulator dug its heels in: "Sure enough, when we first came out with a really severe scenario, their economists were sceptical about how severe it was," the supervisor – an economist by training – recalls. "The economic reality afterwards turned out to be even more severe."

The episode cuts to the heart of a problem that has dogged administrators of stress tests – now established as the post-crisis barometer of the health of a nation's banks – throughout the last decade: what does 'severe but plausible' look like?

Regulators' worst-case scenarios, gradually watered down by intense lobbying from lenders and politicians, have not found their consensus on that point tested by real events – until now.

The economic devastation wrought by Covid-19 is already significant: the hits to employment, gross domestic product and other key macro factors regulators ask banks to test to has already surpassed supervisors' severely adverse scenarios, and shows every sign of getting considerably worse before it gets better.

While the US is pressing ahead with its annual testing cycle, European regulators have already abandoned this year's round altogether. The decision has raised eyebrows – not least since real-world loan-loss provisioning has already outstripped the Federal Reserve's previous worst case. But, in fact, it's more in tune with the shop-floor reality that banks are already pursuing in the wake of the crisis, where a clear trend is emerging. In the absence of credible inputs for standard models, banks are appraising the potential of methods borrowed from stress-testing to support everything from credit loss provisioning to real-time market risk management.

Conversations with scenario analysis experts at banks, buy-side firms and stress-testing vendors, as well as several former regulators, suggest a shift is under way: decades of established price theory underpinning stochastic modelling methods are being cast aside in terms of more fundamentally driven approaches: shocking loan books with prebuilt scenarios from vendors, running simulations using data from past crises and actively reappraising exposure to major creditors using expert judgement.

Once markets normalise, it seems unlikely firms will simply re-base their assumptions on the pandemic being the worst case for probability-of-default models, for instance, or gauges of interest rate volatility, and continue to model markets the way they always have. Even if models aren't supplanted, they will rightly be subjected to challenge more routinely via alternative approaches.

A willingness by banks to cast aside the old and revisit the notion that the future can be predicted by selectively replaying the past should be embraced: it could unleash a period of immense creativity in risk management. As former Chicago mayor and investment banker Rahm Emanuel once observed, it's a hell of a shame to let a good crisis go to waste.

Tom Osborn
Editor, Risk Management, *Risk.net*



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A new risk era –

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Jose Ribas, global head of risk and pricing solutions at Bloomberg, on how risk management at financial institutions is changing in the wake of the pandemic, the subsequent volatility, role of regulations and how technology can help risk teams be more agile

Managing procyclical increases in trading book capital requirements

Bankers say eurozone banks with the best models and low qualitative add-ons are the least able to offset Covid-driven rise in backtesting multiplier. By Samuel Wilkes

As the economic lockdown adopted by governments around the world to combat the spread of coronavirus threatened a whole series of unforeseen hits on bank capital, regulators scrambled to provide relief. But rewarding banks for poor model risk management probably wasn't quite what they had in mind.

And yet, that's the possible perverse result of a measure adopted by the European Central Bank (ECB) to help banks avoid a spike in market risk capital. A letter written by ECB president Christine Lagarde to lawmakers on May 20, setting out the ECB's views on prudential relief provided

Need to know

- Market volatility triggered by disruption to European economies from the coronavirus pandemic has been causing unwanted procyclical increases in banks' trading book capital requirements.
- Regulators around the world have been attempting to prevent banks from facing an increase in minimum requirements, due to a capital multiplier that is based on the number of times banks' actual trading losses exceed those estimated by their models, known as backtesting.
- US and Swiss supervisors have frozen the multipliers applied to their banks, but legal impediments mean European supervisors have had to come up with creative ways to offset the increase.
- The European Central Bank decided to lower a separate add-on that is set depending on the quality of a bank's model governance.
- As a result, however, bankers say those eurozone banks with the best models and low qualitative add-ons have not been able to fully offset the increase in the backtesting multiplier, while those with governance deficiencies have benefited more from the relief.

so far, makes it clear that the route the single supervisory mechanism (SSM) has taken is not its first choice.¹ The regulator's hands were tied by legislation, which would need to be changed to permit a more logical approach.

The potential rise in risk-weighted assets (RWAs) for market risk stemmed from the impact of extreme volatility on the backtests banks use to assess the accuracy of their models. But the mechanism for calculating capital requirements based on those backtests is written into law.

As a result, the SSM could only respond by lowering a separate discretionary multiplier, which is meant to capture vulnerabilities in a bank's management of internal models. That's not such good news for banks that had been managing their models well, and therefore already had a low multiplier.

"It is breaking the level playing field, because the 'bad' banks having a multiplier greater than one can benefit fully from this offset, but the 'good' banks cannot fully benefit from the offset," says a market risk expert at a eurozone investment bank.

The obvious answer would be a legislative tweak to free the ECB's hands. And it so happens that some emergency rule changes are already on their way through the legislative process, to alter other elements of the prudential framework in response to Covid-19. But it is far from clear whether lawmakers could reach consensus about modifications to the market risk capital rulebook in the short timeframe they are targeting.

It all adds up

Under the Basel Committee on Banking Supervision's Basel 2.5 global standards, banks calculating market risk capital requirements using internal models must add together the results of two measures that estimate losses on their current portfolios to determine their market RWAs.

The first, known as value-at-risk (VAR), estimates the losses the bank might face based on observed market conditions from the past year or a shorter defined period. The second measure, stressed VAR (SVAR), estimates the losses the bank would face if it had its current portfolios over the worst-ever

trading days in the bank's history, which for many in the eurozone occurred during the 2007–08 financial crash or the 2010–12 sovereign debt crisis.

In Europe, three multipliers are also added onto both VAR and SVAR, known as base, qualitative and quantitative multipliers. The base multiplier is set at three and then increased by the addition of the other two multipliers.

The qualitative multiplier is determined by the ECB during reviews of banks' internal models. The head of market risk modelling at a second eurozone investment bank believes no bank has a qualitative multiplier set at zero and that the ECB sets no upper limit, but he expects many banks to be below one.

The market risk expert at the first eurozone investment bank agrees the qualitative multiplier add-on can go above one. He says banks deemed to have the best model processes have add-ons set between 0.3 and 0.5. That means the banks' base plus qualitative multiplier would be between 3.3 and 3.5.

"Everything in and around the model will determine what is your qualitative multiplier," says the market risk expert. "It is based on the model risk governance and its effective use in the bank – it is very important for the ECB to see that what you use as a metric for the VAR is also being used operationally for monitoring risk. They will also look at how quickly you identify and remediate deficiencies found in the model."

The quantitative multiplier gradually increases the more times losses in a single trading day exceed the results of VAR over the most recent 250 trading days (essentially, a calendar year). This backtesting multiplier add-on ranges from zero for banks scoring five or fewer exceptions and increases to a maximum of one for banks finding 10 or more breaches. Hence a bank with 10 or more backtesting exceptions over the previous year and a qualitative add-on of one would have a total VAR and SVAR multiplier of five.

Due to the market volatility caused by disruptions to European economies from the coronavirus

¹ Christine Lagarde, ECB (May 2020), Opinion of the ECB of 20 May 2020 on amendments to the Union prudential framework in response to the Covid-19 pandemic, <https://bit.ly/2X0b8l8>



"The ECB thinks it hasn't got the same mandate to provide the offset as other jurisdictions"

Jouni Aaltonen, Association for Financial Markets in Europe

pandemic, banks are seeing far more backtesting exceptions because VAR doesn't have enough volatile days in its calibrated time series to forecast such fierce conditions.

This year's first round of quarterly disclosures revealed the extent to which VAR was unable to predict volatility. On May 5, BNP Paribas reported nine backtesting exceptions during this year's first quarter alone. BNP states on average it usually finds slightly more than two exceptions per year.

Eight of the largest US banks clocked 42 exceptions between them in the first quarter of this year. According to analysis conducted by *Risk Quantum*, Q1 2020 overtook the fourth quarter of 2018 as having the most exceptions found during a quarterly period for the peer group since 2015. The 2018 peak for those eight banks was just six exceptions (see figure 1).

The combination of more backtesting exceptions and VAR increasing to levels last seen during the 2008 crisis means market risk capital requirements have been rising at a time regulators and governments want banks to use capital buffers to maintain credit to the locked-down real economy.

"By having this automatic mechanism that counts exceptions that aren't related to model deficiencies, bank's capital requirements are becoming procyclical," says the head of market risk modelling at the second investment bank.

A peculiar fix

On April 16, the ECB announced it would allow banks within the eurozone to offset increases in trading book capital requirements stemming from the quantitative multiplier by lowering the qualitative multiplier.²

"It is peculiar, because the emergency measure to mitigate the effects of the crisis is based on a parameter in the calculation of capital [which is]

assessing, for example, your history with an internal model," says the head of market risk modelling. "It is [assessing] something that might be dating back five, six or 10 years, but it is the only thing the ECB could do to provide immediate relief."

However, three sources say this approach means banks with poorer-quality risk management processes and higher qualitative multipliers are better able to offset increases in their capital requirements.

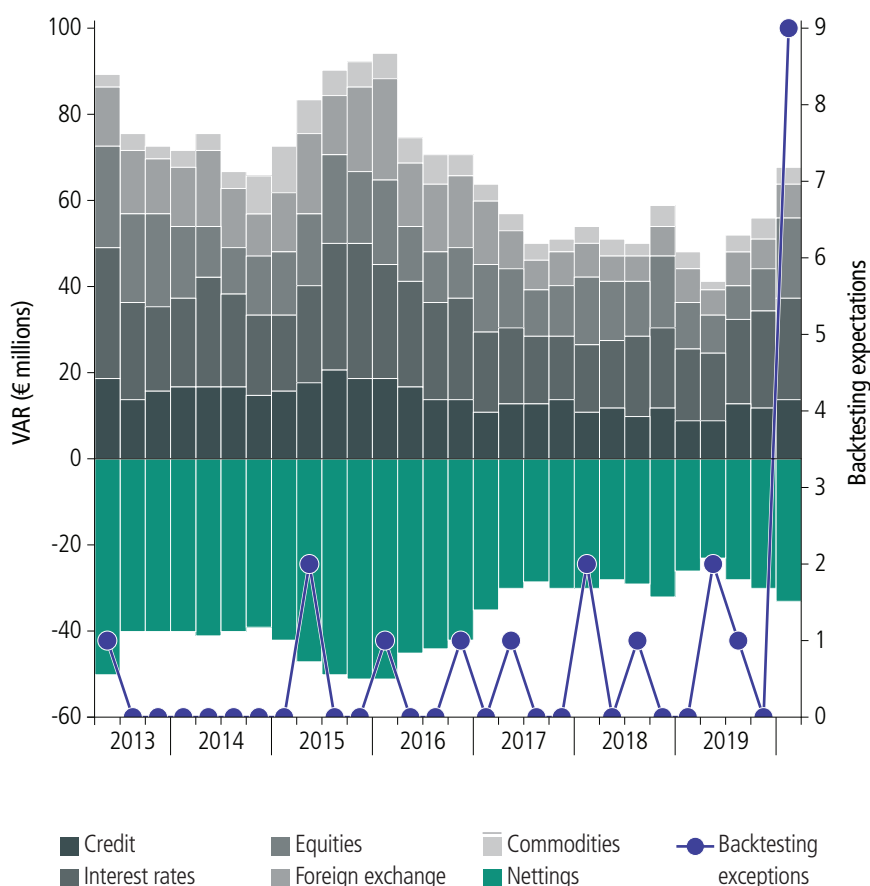
"If a bank has always been showing problems and comes with a high multiplier, then they are better off, and [the ECB's relief] is more effective compared to a bank that has a very good model and comes with a very low multiplier. This brings the wrong incentives," says the head of market risk modelling at the second investment bank.

In fact, for some banks with the best scores for model governance, their qualitative multiplier is lower than the Covid-induced rise in the quantitative multiplier. This means the relief granted by the ECB cannot fully offset the spike in market RWAs.

Legal restrictions

Banks don't blame the ECB for the situation. Current EU bank capital laws – known as the Capital Requirements Regulation (CRR) – do not allow supervisors to freeze multipliers, contrary to what was suggested by the Basel Committee. The Basel II standards gave supervisors leeway to consider factors such as extreme market movements before deciding the consequences of backtesting exceptions.

1 BNP Paribas average daily VAR and quarterly backtesting exceptions



Source: BNP Paribas quarterly earnings presentations

² ECB (April 2020), ECB Banking Supervision provides temporary relief for capital requirements for market risk, <https://bit.ly/2X312QA>

The Swiss Financial Market Supervisory Authority and the US Federal Reserve have taken advantage of this flexibility and allowed their banks to freeze multipliers to a point before the crisis started. But Andrea Enria, chair of the SSM, told a hearing of the European Parliament on May 5 that he did not have the same room to manoeuvre.

"We have also observed extraordinary levels of volatility in financial markets since the outbreak of the pandemic. This pushed up the quantitative market risk multiplier, which can rise when market volatility has exceeded the levels predicted by a bank's internal model," said Enria.

He continued: "While the international prudential rules of the Basel Committee do provide for the legal possibility to smoothen such one-off events in market risk models, such provision is not fully available in our legal framework."

Eurozone banks had feared before the ECB's announcement that there might be no relief at all for the rise in market risk, due to the CRR text. The head of market risk modelling at the second eurozone investment bank told *Risk.net* before the ECB's announcement that banks were petitioning the SSM to take a tenuous interpretation of article 366 of the CRR that would allow them to freeze their multipliers.

The article requires VAR to be measured against two different profit and losses (P&Ls), which are known as actual and hypothetical P&Ls.

Actual P&L is the value of a bank's portfolio at the end of a trading day, whereas hypothetical P&L is the bank's portfolio from the end of the previous trading day measured using market data at the end of the current trading day.

The multiplier is determined by the highest number of exceptions caused by either actual or hypothetical P&L. The CRR allows competent authorities to exclude actual P&L from the backtesting, if some of the actual P&L exceptions were not caused by model deficiencies. But it does not allow the exclusion of the hypothetical P&L.

"The ECB thinks their hands are tied by the CRR text in article 366 (4), which doesn't allow hypothetical P&L breaches to be discounted," says Jouni Aaltonen, a director focusing on prudential regulation at the Association for Financial Markets in Europe (AFME). "This may well be a drafting error, but it has led to this situation whereby the ECB thinks it hasn't got the same mandate to provide the offset as other jurisdictions."

The head of market risk modelling at the second eurozone investment bank agrees this may have been a drafting error. But alternatively, he suggests it could have been a deliberate decision to exclude only actual P&L, in order to screen out intraday



Andrea Enria, European Central Bank

changes to a bank's portfolio composition that VAR hadn't been able to account for.

In any case, the restriction left the ECB with no choice but to target the qualitative multiplier instead, which is entirely at the supervisor's discretion.

Similarly, the UK Prudential Regulation Authority is bound by the same rule until at least December 31, 2020, when the Brexit transition period is due to end. The PRA therefore allowed UK banks on March 30 to lower the capital charge incurred from risks banks don't include in VAR (RNIV) – a UK-specific discretionary capital add-on. A source says the PRA's approach could lead to similar perverse outcomes as the ECB relief, because it would benefit those banks with a larger capital charge from RNIV more than others.

The ECB declined to comment for this article. The PRA was unable to comment before publication.

Head-scratching lawmakers

In her letter of May 20, Lagarde said she would prefer to be able to freeze the quantitative multiplier instead of tinkering with the qualitative add-on, and asked lawmakers to intervene.

"Additional measures, such as disregarding overshootings resulting from both actual and hypothetical losses in extraordinary circumstances, would better achieve this objective," Lagarde wrote. "Hence, CRR should be amended to ensure that, in extraordinary circumstances, competent authorities can take appropriate action, in line with the BCBS standard."

Conveniently for Europe's banks, European legislators are currently making amendments to the CRR to extend the transition to new accounting rules for credit risk and to exclude certain exposures from leverage ratio requirements.

Draft proposals published by the European Commission on April 28 do not include a revision of market risk capital requirements. Sources say bank lobby groups are now advocating for the European Parliament or Council of the EU to insert an amendment into the CRR that would allow supervisors to freeze quantitative multipliers.

"We are trying to get legislative change to the CRR text to align it with the Basel standard, so that the supervisors have the right flexibility to deal with this issue," says AFME's Aaltonen. "However, it is difficult to get traction on this issue at the moment because it is not well understood by co-legislators."

Two parties in the European Parliament are sympathetic to the pleas from the ECB and the banking sector. The shadow rapporteurs for the European People's Party and Renew Europe – Othmar Karas and Caroline Nagtegaal – both proposed allowing supervisors to lower backtesting multipliers during an exchange of views in the parliament on May 18.

The two parties, however, will need support from other groupings to include the amendment within the parliament's final draft proposals. Together, they only control 284 seats out of 704 in the parliament – 69 short of a majority.

Parliamentarians are trying to finalise their negotiations quickly in order to hold a plenary vote approving the rule changes in June.

Watch out for the cliff

Without amendments to the CRR to allow supervisors to freeze multipliers, the measures taken by the ECB and PRA are probably the most relief banks will be able to receive for the spike in market risk.

"Changing CRR would be the neatest solution out of this mess," says the head of market risk modelling at the second eurozone investment bank.

Failing that, banks warn the measures taken so far will also have to be renewed once they expire. Both the ECB and PRA respite will last for six months, and supervisors will then review whether to extend it.

As backtesting exceptions are counted over a one-year period, breaches clocked up in March this year won't drop out of the observation period until after the first quarter of next year. If the ECB and PRA allow their measures to lapse in October and September, respectively, European banks will face jumps in their market risk capital requirements.

"The relief on the multiplier is certainly welcome at this time, but we need to keep in mind that the backtesting impact will affect banks until Q1 2021. So regulators should consider extending this relief at least until that point in order to avoid cliff-effects later this year," says a risk manager at a third eurozone investment bank. ■

Previously published on Risk.net

Bloomberg

Risk doesn't wait for market close

Many market participants rely on end-of-day batch systems to perform analytics and, in the current environment, they may see significant negative impacts on their business. Leila Sadiq, front-office risk head of product at Bloomberg, explores how the turbulence caused by the Covid-19 outbreak renders end-of-day pricing and risk analytics ineffectual, and considers the alternatives



Since the financial crisis that began in 2007–08, an eclectic range of risk management practices have been integrated across the whole value chain, from execution to post-trade. However, significant gaps remain – especially in terms of the ‘when’ and ‘how’ of risk management best practice. While various larger institutions are able to compute and monitor intraday risk, many market participants still rely on end-of-day batch systems to perform analytics – which, in the current environment, could have a significant negative impact on their business.

The main problem is that Covid-19 renders end-of-day pricing and risk analytics ineffectual, if not obsolete. Extreme volatility and unprecedented daily swings in market activity, alongside fundamental changes in market structure, have left some risk managers and risk-takers with access to limited information, and unable to make informed decisions. Waiting for an overnight batch, or even the next day, to act means valuable time can be lost, potentially coming at a financial loss for the organisation.

Examples of unprecedented activity abound. We’ve seen massive selloffs across various markets and a significant increase in volatility, with the Chicago Board Options Exchange Volatility Index reaching 82. West Texas Intermediate futures went negative for the first time in history. Meanwhile, in equity markets, there have been rallies followed by drawdowns followed by rallies within the same day (see figure 1).

In the shifting sands of this environment, looking at overall market value – delta and vega – during the day is vastly different to end-of-day risk reports. Traders and portfolio managers executing hedges based on their end-of-day risk may have found themselves exposed to huge drawdowns. In periods of extreme volatility, any hedges need to go beyond local Greek exposures to incorporate a broader set of macro scenarios, as well as granular term structure risk. Waiting for end of day can double or triple the cost of hedging – or even send it in the opposite direction.



Leila Sadiq

Meanwhile, unprecedented market structure changes – such as low US interest rates and negative oil prices – have precipitated system failures, impacting some firms’ ability to meet their reporting obligations. Systems unable to cope with such changes pose a serious business continuity risk for those firms that continue to use them.

Lessons learned:

Intraday scenarios and agility

Although Covid-19 has created a turbulent environment for financial markets, some clear lessons have already begun to emerge.

First, it has brought the ‘when’ of risk management to centre stage. The reality is that, in extremely volatile markets, understanding risk exposures in real time means you will be better equipped to take the best actions to mitigate them and protect the interests of your organisation. Relying on an overnight batch or the next day is no longer a dependable way of doing business.

Another lesson learned is the importance to firms of upgrading their scenario analysis and modelling capabilities to be able to weather such turbulent market conditions. Having flexible and robust scenario analysis can prove an essential lifeline when everything else might be failing.

Agility is also essential – firms must be able to deploy features and fixes to deal with issues sparked by huge market structure changes. They need access to the right information at the right time to know where they stand. They also need to build relationships with the right vendors that are nimble, and can provide new features and fixes in a timely manner.

Bloomberg’s solution

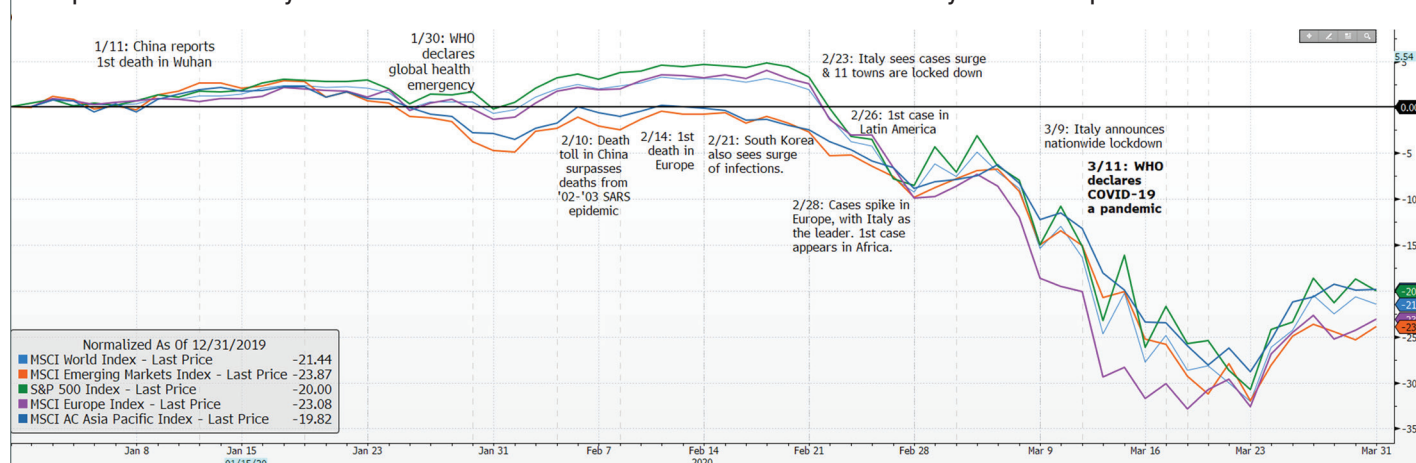
Bloomberg’s Multi-Asset Risk System (MARS) offers a comprehensive suite of risk management tools that delivers consistent, consolidated results powered by state-of-the-art models and cross-asset pricing libraries. Intraday and end-of-day risk analytics sit side by side within MARS. Sensitive to the huge structural changes of recent months, Bloomberg is able to respond quickly and update models in an appropriate and timely manner.

MARS offers a flexible and transparent scenario and risk engine that encompasses historical market moves and customised shocks. Bloomberg’s MARS provides transparency, scale and agility to customers in an ever-changing market environment.

The seamless integration of diverse but related tools means a single system takes care of pre-trade, idea generation, market moves, trading workflow and risk management.

Covid-19 has shown market participants that their systems need to be agile and provide intraday and robust analytics. Being complacent with what you have won’t prepare you for the unexpected. Visibility is the first step towards informed action – if you can see the present clearly, you can prepare for the future. ■

1 Unprecedented activity as a result of the Covid-19 outbreak – Covid timeline and year-to-date performance



The problems caused by FRTB delays and stressed VAR

Expected shortfall, which gives more weight to the calculation of losses during tail events, would stop Basel 2.5 duplicate capital charges, but backtesting remains an issue. By Samuel Wilkes

In a parallel world, regulators had already introduced their much-trumpeted overhaul of market risk rules, the Fundamental Review of the Trading Book (FRTB), at the start of 2019. The old stop-gap method for calculating market risk-weighted assets (RWAs) was discarded. And not a moment too soon. Amid the chaos of the coronavirus pandemic, bankers could at least take comfort that they were no longer subject to Basel 2.5 with its flawed and procyclical methodology.

Or not. In reality, years of regulatory wrangling have delayed FRTB, leaving risk heads cursing the inadequacies of the current regime and playing a futile game of 'what if'.

"Had we accelerated FRTB, we would have been better from a market risk capital perspective today," says the head of market risk at a global investment bank.

And yet there are murmurs of disquiet about FRTB. Bankers are questioning whether its supposed fix for the procyclicality of today's regime will be as effective as hoped.

Need to know

- A double-counting defect in the methodology for calculating market risk capital has reared its head during the current spell of volatility.
- The methodology is supposed to account for losses banks would face in normal conditions and in a crisis scenario – but as current conditions are a crisis scenario, the requirements are partly duplicated.
- Incoming FRTB rules, long delayed by regulators, promise to address the problem by replacing the overlapping requirements with a single measure of risk.
- But the new rules could still lead to higher capital from backtesting exceptions.

The problem centres on value-at-risk (VAR), the long-established method for estimating financial risk. FRTB does away with VAR as a measure of a bank's trading book exposure and replaces it with expected shortfall, which is thought to be a more accurate gauge of tail risk.

VAR is not banished entirely, though. Under the new regime, the accuracy of banks' risk models is backtested using VAR. During periods of volatility, banks fear that the failure of these tests could force them to stop using their own models and adopt a standard formula for calculating RWAs. The formula is far more conservative and would result in higher market risk capital requirements for many banks.

So, rather than flattening out wild swings in regulatory capital, FRTB could perpetuate them.

"The question is: would I get an increase in RWAs in a crisis under FRTB that is milder than today's rules?" says a head of risk modelling at a European investment bank. "It is very difficult to say."

The market turmoil wrought by the coronavirus outbreak has exposed a double-counting defect in Basel 2.5. To calculate minimum market risk capital requirements, banks add together two versions of VAR. The first is regular VAR, which estimates the losses a bank's portfolio would suffer if it was subject to the worst trading day in the past year. The second is an estimate of losses for the same portfolio if it was subject to the worst trading days in the bank's history, known as stressed VAR (SVAR).

For most banks, SVAR is calibrated to the financial crisis of 2008, while, for some European banks, it is set to the sovereign debt crisis between 2010 and 2012.

SVAR was inserted into the capital framework after the financial crisis, when it became evident that the old methodology of using VAR alone severely underestimated capital requirements. VAR is based on recent historical data and so is unable to predict sudden extreme loss events.

A long-standing criticism of Basel 2.5 is that as soon as markets collapse, banks' VAR numbers

increase to reflect losses during a crisis. So, as well as holding a stressed capital add-on, banks also face capital increases in their normal VAR during times of volatility.

"We are in a stress environment that is as big in terms of VAR requirements as the 2008 period. This has created a double-counting effect, which we never thought would happen so soon. So that has been a shortcoming," says the head of market risk at the global investment bank.

Banks complain the increase in capital is proving a nuisance at a time when supervisors are pressuring them to free up capital and increase lending to businesses to help boost virus-ravaged economies.

Stress scenario

Bankers estimate VAR is usually at a level of between one-quarter to one-half of SVAR under normal market conditions. But the recent upheaval is causing VAR to shoot up, almost to a par with SVAR, say two bankers.

"What is happening is that we have got a crisis, and VAR is getting to the same level as SVAR," says the head of modelling at the European bank. "Typically, VAR and SVAR can be in a ratio of one over two or three."

A head of market risk at a second European investment bank says it is possible for banks to lower VAR by exiting loss-making positions, which should stop capital requirements jumping so high.

However, the head of modelling says the benefit of de-risking is small. Selling inventory at today's prices would result in realised losses, and there's no guarantee of finding a buyer in a panicked market. To offset derivatives positions using hedges is also expensive. Even if they are able to exit positions, banks may find that once they enter into the same exposures in the future, VAR would just jump again.

VAR is calibrated using an aggregate of losses from the previous 250 trading days, or fewer for some firms. If a bank were to use the maximum length of historical data – a year – then it means

positions that suffered heavily in March this year will increase the level of VAR until the observed trading days exit the time series, which would be after March 2021.

"VAR being higher will stay for some time, depending on your recalibration of VAR," says the head of risk modelling. "These events are recent and it will take a lot of time for them to exit the typical calibration window of a VAR engine, which could be one year."

It's even possible the current period of turmoil will replace the 2008 financial crisis as many banks' SVAR reference point. This would put upward pressure on overall capital requirements. But the effect will be limited, says the head of market risk at the second European investment bank.

"SVAR is the worst days of the financial crisis: the Lehman Brothers collapse," the head says. "Can you have even worse than that? We have seen something close, but can that be much higher? There is a bit of double-whammy effect, but I think it is going to be marginal."

Exacerbating the increase in market risk capital is a multiplier applied to both VAR and SVAR. The multiplier is based on the results of a backtesting exercise that compares profit-and-loss (P&L) figures with VAR estimates over the previous year. The test is designed to punish banks whose models aren't accurately reflecting risks in their own portfolios (see box: *How big a jump?*).

Banks are experiencing a rise in backtesting breaches because their VAR models have not yet captured the recent period of extreme volatility.

"The combination of these procyclical effects results in a material increase in market risk-weighted assets," says Gregg Jones, a director of risk and capital at the International Swaps and Derivatives Association.

Supervisors in the UK, US and Canada have taken steps to nullify the multiplier effect. Most recently, the European Central Bank (ECB) announced it would allow eurozone banks to reduce a qualitative multiplier applied to VAR and SVAR to offset backtesting exceptions.

FRTB or not to be

The double-counting and procyclicality inherent in Basel 2.5 are part of the reason that standard-setters devised FRTB. The Basel Committee on Banking Supervision published the first version of the regime in January 2016, with a deadline for jurisdictions to implement the rules into their local laws by the start of 2019.

"Basel 2.5 was designed as a short-term fix in answer to the 2008 crisis, which revealed shortcomings in banks' market risk-weighted assets. FRTB is supposed to be the longer-term solution,"



says the head of market risk at a third European investment bank.

But concerns from banks and national legislators over the capital impact of the standards led the Basel Committee to revise the original rules and push back their deadlines. The newest version of FRTB was unveiled in January 2019 with an implementation date of January 2022.

Ironically, the coronavirus crisis has forced the Basel Committee to announce a further one-year delay to FRTB, along with other bank capital rules that form Basel III. If jurisdictions follow the Basel Committee's timeline, bank capital requirements will be determined under FRTB from January 2023.

The major difference between Basel 2.5 and FRTB is that banks will now use expected shortfall to measure trading book exposure. Expected shortfall gives more weight to the calculation of losses during tail events. The figure is calibrated to the worst year for a bank's portfolio: for most banks this is the 2008 financial crisis, as with Basel 2.5.

The new regime is predicted to force banks to hold higher levels of capital during normal times. Crucially, it is meant to insulate banks from steep rises in capital at a time when banks are under most stress.

"FRTB starts from a higher base because it generally increases capital requirements from today,

but at least we would not be seeing this rapid increase as we are seeing under Basel 2.5," says the head of market risk at the global investment bank.

However, the new rules don't completely solve the problem of procyclicality in the calculation of market risk capital, experts say.

Under FTRB, banks using the internal models approach must backtest their loss estimates against P&L figures. Backtesting expected shortfall is a controversial area, and so the new rules stipulate that banks use VAR for backtesting.

There are two backtests: a bank-wide test and a desk-level test. The first requires banks to compare the VAR of all portfolios using internal models against the P&L for these desks, similar to Basel 2.5. Banks apply a multiplier of 1.5 if they fail the test four times or fewer over a 12-month period. The multiplier rises gradually to two if banks clock 10 or more exceptions.

The backtest for individual desks has a potentially greater impact on capital. If, over a 12-month period, a bank's trading desk either clocks 12 exceptions or more at a 99% confidence level, or 30 or more exceptions at a 97.5% confidence level, then it must stop using the internal models approach and switch to the regulator-set standardised approach.

"There would be a capital impact from

FRTB in the current market volatility because if your backtesting fails then you are on the standard approach, which is meant to be more punitive, although that is not entirely clear in all circumstances,” says the senior market risk expert at a US investment bank.

Whether the increase resulting from failures of backtesting under FRTB would be higher or lower than the increase banks are seeing under Basel 2.5 depends on the proportion of internal model desks that banks have, says the head of modelling at the European investment bank. Internal model desks that pass the desk-level backtest would still see rises in the bank-wide multiplier as a result of increased volatility.

More desks and banks are expected to use the standardised approach instead of the internal models approach. According to a survey conducted by the ECB in 2019, 40% of banks under their supervision plan to turn off their internal models and solely rely on the standardised approach. A further 20% of banks plan to only have a subset of desks using internal models.

For those banks at least, FRTB guarantees to solve their woes of procyclicality of market risk capital requirements.

“If you are mostly using the standard approach, I don’t think market volatility from a crisis is going to have a massive effect,” says the head of market risk modelling at the first European investment bank. “If you have a high proportion of desks using the internal models approach, then my expectation is that falling into the standard approach will cost you more than the simple increase in Basel 2.5’s multiplier.”

Response time

Banks are currently exploring ways of minimising breaches of the backtests under Basel 2.5 by making their VAR models respond faster to changing volatility in the future.

One option is to shorten the time period VAR is calibrated to – the idea being that a shorter observation period would mean volatile trading days make up a bigger proportion of the aggregated VAR number. This would make the VAR output more sensitive to volatility and more reflective of actual losses.

“In your normal non-SVAR model you could shorten the lookback window because the shorter it is the quicker the additional new market volatility is going to feed into your final VAR,” says the senior market risk expert at the US investment bank.

The head of modelling at the first European investment bank says the bank had recently undergone a model change and shortened its VAR time series prior to the coronavirus crisis, but it didn’t prove to be a silver bullet.

“This is not a guarantee to prevent exceptions,” says the head. “There is always a latency, and what was peculiar [about] this crisis is that it affected all risk factors and all asset classes. At first, we had exceptions driven by the equity market and our model learnt about the equity situation so it wouldn’t produce more exceptions for equities. But then corporate credit plummeted, and you might have exceptions because of that.”

Another option would be to incorporate into VAR engines a scaling factor based on the losses from previous bouts of severe volatility. Once the VAR lookback period begins to pick up recent upsurges

in volatility, the scaling factor will increase the estimated losses in VAR to reflect those seen in past volatile periods, rather than relying on an average of the most recent historical period. A further alternative would be a weighting factor that leans more heavily on the most recent observations in VAR.

Under Basel 2.5, the trade-off with all of these alterations would be that banks’ capital requirements would be more volatile and shoot up more quickly once large losses enter.

“It would be a balancing act because they would be generally capital-increasing in more volatile times, but that would be compensated by fewer backtesting exceptions, and in turn you wouldn’t then get multiplier increases,” says the senior market risk expert at the US investment bank.

Banks will need to enter into discussions with regulators about any modifications to VAR methodology designed to reduce the risk of backtesting breaches under Basel 2.5 or FRTB. And the final text of FRTB is, if anything, more prescriptive than Basel 2.5 about backtesting methods. Basel 2.5 allows banks to use any lookback period of one year or less, whereas FRTB explicitly mandates a 12-month period, equally weighted, for backtesting at the trading desk level.

Regulators might not be receptive to such a change, says the market risk expert: “There has been some discussion on possibly changing the VAR methodology so you don’t have to mitigate the [Basel 2.5] multiplier, but that is a sensitive topic to discuss with regulators. They would quite rightly respond: ‘Why did you not previously think that was a good idea?’” ■

Previously published on Risk.net

HOW BIG A JUMP?

Banks apply a multiplier to their value-at-risk (VAR) and stressed VAR (SVAR) figures depending on the results of a backtest. The minimum multiplier is set at three for all banks as long as they score five or fewer exceptions in the test. The multiplier gradually increases to a maximum of four as breaches rise to 10 and above.

Today’s market volatility is causing more exceptions as losses exceed VAR, which further increases the market risk capital requirements on top of VAR rising.

Banks complain backtesting in a crisis doesn’t carry out the test’s intended purpose because VAR cannot forecast the future market volatility based on historical data from a calmer past. Rather than being a result of model deficiency, the number of exceptions is more a function of how fast the current market conditions seep into VAR’s time series.

Because of this, the head of market risk at the second European investment bank, speaking in the second week of April, says he expects all banks to have reached the maximum number of exceptions. The increase in the multiplier from three to four would in theory represent a 33% rise, translating into a similar hike in market risk capital.

However, the head of modelling at the first European investment bank says supervisors sometimes place an add-on to the multiplier based on a qualitative

review of the bank’s treatment of internal models.

If this is the case, the starting point of the bank’s multiplier could be 3.5, for example, and would increase to a maximum of 4.5 if the bank clocked 10 backtesting breaches. In that example, the steepest increase in the multiplier would be 28.5%. For desks that are closely watching the capital efficiency of trades, a lower percentage increase would be beneficial.

The maximum possible increase in market risk capital from the multiplier would also be smaller once banks factor in the effect of an incremental default and migration risk charge on top of their VAR and SVAR.

Two bankers estimate the total increase in market risk capital requirements across the industry would be roughly 20–35% from both VAR and the multiplier increasing in the current market conditions.

The head of market risk at the second European investment bank estimates the increase in VAR accounts for a 15–20% rise in market risk capital, with the multiplier adding a further 15% to market risk capital.

A UK bank source estimates the total increase in market risk capital of the two together would be 20–30%.

Impact on Libor transition for the banking sector

As the UK's Prudential Regulation Authority reiterates its 2021 warning, dealers say Covid-19 is forcing smaller lenders to divert their resources. By James Ryder

Smaller banks are being forced to put their Libor transition preparations on hold amid a coronavirus-induced resource crunch, larger dealers are warning – throwing into jeopardy regulators' plans to have the whole market migrate to new risk-free reference rates from the end of next year.

While larger banks have dedicated transition teams, smaller firms are being forced to divert resources during ongoing market panics and a massive uptick in emergency lending – meaning they face a challenging time completing important transition work on schedule, said Jason Granet, head of Libor transition at Goldman Sachs.

"In this environment, [attention paid] to Libor shrinks to zero," Granet said of smaller firms, during a *Risk.net* panel discussion on Libor transition on May 6.

The comments join a growing chorus of concerns that the industry's mission to migrate away from legacy reference rates risks being derailed by the coronavirus crisis. In a May 7 statement on regulatory priorities in light of Covid-19, the UK's Prudential Regulation Authority announced its intention to "resume full supervisory engagement" on Libor transition efforts from June 1, including requiring firms to take part in mandatory data reporting at the end of this quarter.¹

From the end of 2021, UK regulators will not compel banks to support Libor rates, calling into question whether the rate will survive beyond that point. Several market participants have called for a formal extension to the transition timeline this implies – but watchdogs have appeared to nix such hopes, offering only a six-month relief period for new Libor-linked lending.

Regular pronouncements such as these are likely adding to the distress of smaller firms, Granet argued, noting the UK Financial Conduct Authority's strong focus on treating transition as a conduct issue for firms.

He described a recent visit to one small bank, during which staff opened a cupboard to show him a large stack of legacy Libor contracts – all of which were yet to be scanned and processed. Those kinds of manual processes were cumbersome and costly for a smaller firm, he added.

Speaking during the same panel discussion, Christian Rasmussen, Americas head of treasury asset and liability management at UBS, argued any lack of preparation among financial firms – whatever their size – was surprising, given the long gestation of the transition and the frequency of statements from regulators on the topic. He suggested that unpreparedness could be a sign of "behavioural issues" in the market.

"The end of 2021 is not that far away. I understand smaller institutions don't have dedicated resources for stuff like this, but we're a year out – the fact that firms are not able to manage something like this as a one-off is surprising to me. I think it does speak to the overall apathy of the market," said Rasmussen.



But financial firms with limited resources were entering survival mode, Granet argued: faced with the daily pressures heaped on them by the coronavirus, long-term issues, such as preparing for Libor transition, became markedly less urgent.

That risks derailing a 2021 transition, he argued: larger firms' preparedness would mean little if many of their counterparties weren't ready to switch. The longer the pandemic went on, he said, the less time small firms would have to dedicate to a growing pile of Libor-related work.

"I have long said that this is a lowest-common-denominator issue. If my organisation is ready but my counterparties are not, it kind of doesn't matter if I'm ready. It's going to require the village to drag everyone along, or there's going to be a lot of frown emojis that are circulated on this topic for many months," said Granet. ■

Previously published on Risk.net

¹ Bank of England (May 2020). Statement by the Prudential Regulation Authority on prioritisation in light of Covid-19. <https://bit.ly/3gRnQe6>

Bloomberg

Why credit risk managers need to see around corners

The Covid-19 pandemic – and the subsequent extreme volatility – has exposed the fragility of long-established market and supply chain systems, affecting borrowers' ability to repay debt. David Croen, global head of credit risk products at Bloomberg, details the need for firms to identify credit risk early on, and be able to make informed decisions to prevent negative impacts



Volatility driven by Covid-19 has exposed the fragility of market and supply chain systems. In these times of turbulence, identifying signs of distress that may impact a borrower's capacity to repay debt, or a customer or supplier's capacity to meet its obligations, has proven critical. As the economic downturn continues, the importance of understanding credit risk will only increase.

Firms that evaluate credit on a periodic or quarterly basis have found themselves particularly exposed, if only by the sheer speed and scale of the changes. Between January and April 2020, a company might have gone from looking 'healthy' to being distressed or even declaring bankruptcy. There are no such things as bad loans, only loans that go bad, as the old adage goes. Keeping abreast of credit risk developments in times of volatility is a key challenge for all traders, front-office staff and risk managers.

With central banks supporting markets by purchasing specific securities, evaluating credit risk runs into an extra level of complication. The moral hazard is apparent – once the US Federal Reserve checks in, can it ever really check out? And, if it does, what could happen to credit? What do these vast and determined purchasing schemes mean for market structure?

Price does not always indicate risk. Frontier Telecommunications, for example, filed for bankruptcy in April 2020. Bloomberg's analytics flagged a rise of default risk beginning as early as 2017, but the bonds did not deteriorate substantially until 2019.

Figure 1 highlights how Frontier bonds responded to the firm's crumbling credit condition.

Firms need to understand the borrower's ability to pay as well as the externalities that may impact it.

Lessons learned: Looking ahead

Covid-19 has shown a need to identify credit risk early on – to see around corners, so to speak – to keep abreast of changes and make informed decisions before the worst happens.

The first task is identifying credit risk. Questions that firms need to ask themselves include: What is the risk of default? In the event of a default, how much can the investor expect to recover? How long could that take?

Then there could be factors such as correlation risk. If a bank lends to a coal mining company, it will need to understand the general state of affairs in the coal mining industry. Technological change is also a consideration as new solutions – such as alternative energy – disrupt old business models.

Pricing, as previously mentioned, should never be the sole measure of risk. Another measure is performance. Is a company paying its bills on time? Beyond this, what is the probability of default? The ability to calculate probabilities of default regularly and dynamically in near real time is crucial for risk assessment – especially in times of Covid-19 and economic volatility.

As for monitoring credit risk, comparability is a useful assessment measure. Comparing credit default swap (CDS) spreads, for example, may be a good place to start, if prices are available and executable.

Systems need to be in place to watch out for daily developments – waiting until the end of the quarter could mean missing valuable clues and perhaps missing opportunities.

Bloomberg's solution

Bloomberg's Multi-Asset Risk System for Credit Risk (MARS Credit Risk) consists of three key elements. First, it provides a comprehensive suite of credit risk analytics, including full calculations of default risk across a term structure of three months to 20 years, model-implied CDS spreads, loss given default, and support for other analytics.

Second, its extensive coverage includes daily updates for more than 385,000 companies worldwide. It also allows room for analysis of private companies in clients' portfolios that are not part of the Bloomberg ecosystem.

Third, it offers flexible delivery, reporting and retrieval so that banks, asset managers and



David Croen

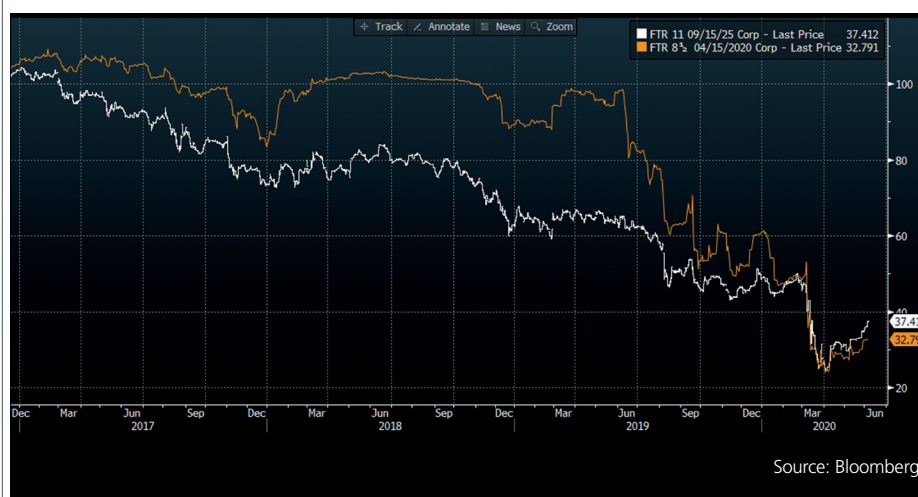
corporations can readily integrate it into their own systems and workflows.

A screen-based interface provides analytics on a near real-time basis. From generating early warnings to monitoring markets, companies and moves, to running time series, peer comparisons and history, MARS Credit Risk aligns with current best practices, providing connectivity across the lifecycle of the credit or counterparty, from front office to trading to risk and capital management.

MARS is one of Bloomberg's ways of helping firms with their predictive analytics. ■

1 Frontier filed

Warnings of Frontier Telecommunications' bankruptcy were flagged long before April 2020





Delay to CSDR and concern over buy-ins

A big jump in trade fails is adding to doubts about the European Union's settlement discipline regime. By Philip Alexander

Need to know

- New rules on settlement discipline under the European Union's CSDR are due to enter into force in February 2021.
- The industry was already concerned about the mandatory buy-ins for repo and securities lending trades that fail to settle. A jump in settlement fails at the height of Covid-induced market volatility has hardened those fears.
- On April 16, Esma chair Steven Maijoor dismissed calls to delay the buy-in rules. But, at a meeting a day earlier, European Commission officials appeared more receptive to the industry's case.
- The industry is still struggling to interpret the buy-in rules. Esma was expected to provide clarifications in the first quarter, but this has failed to materialise.
- Some suggest a compromise, where penalties for late settlement are introduced on schedule next year and buy-ins are postponed until later, may be the best way forward.

On April 16, a terse letter from Europe's top securities regulator landed on the desks of bank lobby groups.

In it, Steven Maijoor, chair of the European Securities and Markets Authority (Esma), dismissed the industry's call to delay the mandatory buy-in regime for failed trades contained in the European Union's Central Securities Depositories Regulation (CSDR), due to take effect on February 1, 2021.

The industry has had plenty of time to prepare, and the rules would take effect as planned, Maijoor wrote.

The tone and content of the letter surprised its recipients. At a meeting a day earlier, officials at the European Commission (EC) appeared receptive to the industry's plight. After hearing that mandatory buy-ins could have worsened liquidity had they been in operation during the volatility in March – when there was a surge in settlement fails – the EC officials agreed to do some more homework.

"The commission is looking at the increase in volumes over the past few weeks, looking at the operational environment and trying to work out what proportion of the population of trades would fall into the fines or the buy-ins, but also how you notify parties of their requirements – the long shopping

list of operational points that need to be worked through," says Phil Lloyd, head of market structure and regulatory customer engagement at NatWest Markets.

Lloyd did not attend the meeting but was briefed on the discussions by those who did.

The conflicting messages have added to the confusion surrounding the rules. Esma has already agreed to one delay. On February 5, it recommended postponing the start of the regime by almost five months from its original start date of September 13, 2020, after it became clear that the mechanism for imposing penalties for late settlement – which will be charged through the European Central Bank's Target-2 Securities system – would not be ready in time. The EC confirmed that postponement on May 8.

The coronavirus may further delay those preparations and make it harder to complete other operational and legal work related to the rules. "There is still a tremendous body of work to do around systems and documentation. Even before Covid-19 added a degree of difficulty to preparations, I think the industry as a whole was struggling to meet the deadline," says Sean Tuffy, head of market and regulatory intelligence for Citi's custody and fund services business.

Like many, Tuffy is still holding out hope for a reprieve. "Now we are in Covid conditions, I think there will be an additional push to rethink the buy-in regime for CSDR, at least for timing," he says. "The regulators have been pretty pragmatic around that for other regulations."

Others go even further. In a report published in April, the International Capital Market Association (ICMA) says there was a "realisation" among market participants that the "effectiveness" of buy-ins "is relatively limited" in such stressed market conditions.

Andy Hill, a senior director of market practice and regulatory policy at ICMA, and a former repo trader, says the mandatory buy-in regime might even have had to be suspended to ensure proper market functioning at the height of the recent volatility. He says this raises serious questions about whether it should be implemented at all.

"In light of what is happening right now, in terms of what the market has just gone through, do you really want to impose a mandatory buy-in regime that, had it been in place in the past few weeks, would have had to be switched off?" he asks. "It would have been unimplementable. Why in the current stressed markets would you think it was helpful to impose a mandatory buy-in regime on European bond markets?"

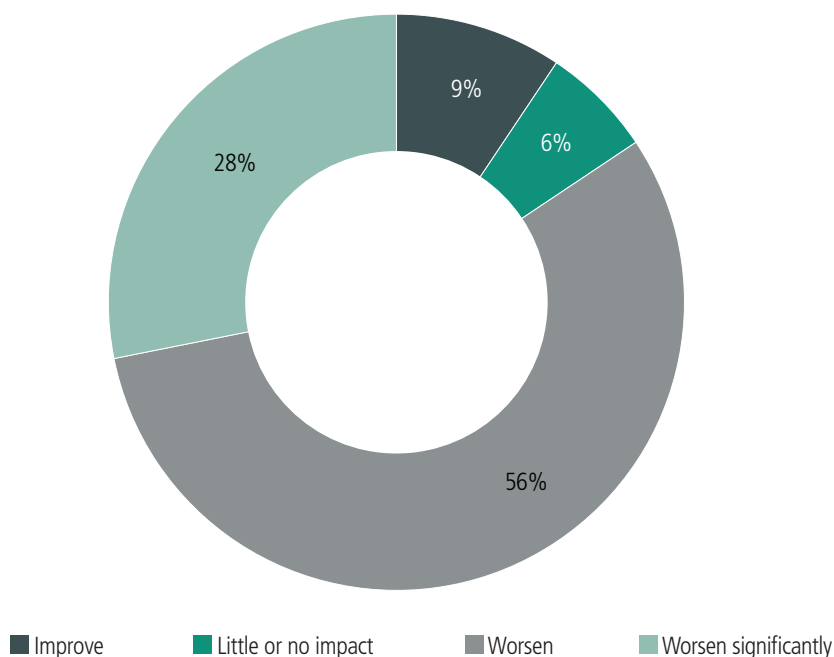
Unclear for take-off

The CSDR's 'settlement discipline regime' imposes automatic daily penalties on counterparties that fail to settle the securities leg of a trade on schedule. If the settlement failure is unresolved after four days – or seven days for illiquid securities – a mandatory 'buy-in' is executed by a third party agent at the failing counterparty's expense, to ensure the securities are delivered to the receiving counterparty.

The industry's compliance efforts were running behind schedule even before the coronavirus outbreak. The main bottleneck so far has been a lack of clarity on how to interpret and implement the buy-in rules. Some of the outstanding questions include whether counterparties can partially settle trades to reduce penalties and buy-ins, and how to avoid a single fail causing a domino effect of buy-ins along a collateral chain, where the same securities are repledged in multiple transactions.

"It's the clarity angle that is delaying us developing both the systems and the documentation that is going to support this regulation," says Adrian Dale, director of regulatory policy and market practice at the International Securities Lending Association (ISLA). "That is all obviously made worse by Covid slowing things down – not just for us, but for regulators as well."

1 Expected impact of mandatory buy-in regime on market efficiency and liquidity



Source: International Capital Market Association

"The mandatory nature of the buy-in was a clear policy choice by the co-legislators when adopting the CSDR and it is meant to protect the securities buyers. In our view, it is premature to consider further action at this point in time, in the absence of concrete evidence following the implementation of the buy-in requirements"

Steven Maijoor, European Securities and Markets Authority

The industry was expecting Esma to issue clarifications in the first quarter. These failed to materialise. "Discussions at expert level are ongoing," Maijoor wrote in his April 16 letter, "with a view to clarifying the respective matters through supervisory convergence measures when needed."

That has not satisfied industry participants. "We haven't had that [clarification] yet," says Dale, "and we don't know when that is supposed to be coming through."

The legal work necessary to incorporate buy-in language into securities lending and repo contracts is on hold pending regulatory certainty. "Trying to repaper literally thousands of contracts is not an easy or quick task, and it has implications for supply and demand – who is going to do that repapering and when? That makes it look tight already, and then you dump Covid on top of that and the resourcing impact, and it's a tough ride ahead," says Dale.

Big fails

Opposition to the CSDR has ratcheted-up following the deterioration in market conditions in March, which contributed to a big jump in failed trades.

A survey conducted by ISLA in early 2019 found that 10% to 20% of securities lending transactions experience settlement fails in normal market conditions, typically on the return leg of the trade. There is no equivalent estimate for repo markets, but the rate is likely to be similar.

According to the April report from ICMA, settlement fails in the repo market peaked at four or five times their normal level in late March. "The marked spike appears to be attributable to two main factors," reads the ICMA report. "First, reductions in the supply of specific securities as the crisis deepened, and secondly operation challenges as firms adjusted to working remotely. Participants talk of problems contacting clients to confirm settlement instructions and technical delays in processing

trades as a result of more manual intervention.”

Euroclear and Clearstream, which operate the two largest CSDs in Europe, declined to provide data on settlement fails for this article. However, Clearstream data for March shows CSD transaction volumes involving European securities more than doubled year-on-year.

Isla's Dale says the higher number of settlement fails was partly a reflection of the increased trading volumes, rather than a big change in the failure rate. Two market sources say, even after the initial spike, settlement fails are still running at around double their usual numbers, which is consistent with Dale's view that they are primarily tracking the higher transaction volumes.

The most illiquid bonds saw the greatest rise in fails, says ICMA's Hill. High yield and emerging market bonds were the worst affected, though some less liquid corporate and sovereign issues also suffered.

Market participants are worried by the prospect of a growing number of bond repo and securities lending trades ending in mandatory buy-ins that could push up costs for the delivering party. Some are likely to respond by cutting back their activity in affected markets, making liquidity still worse and potentially causing fail rates to rise further. A survey of 44 buy- and sell-side repo and securities lending participants conducted by ICMA last year revealed that 37 of them expected mandatory buy-ins to damage liquidity conditions in bond markets (see figure 1).¹

Greater settlement certainty was intended to benefit the buy side, but Citi's Tuffy says the Covid crisis may only heighten the unease felt by asset managers about the CSDR buy-in regime.

“There will be a renewed push to discuss worries around CSDR, its impact on market liquidity, and whether bond trading in particular will move outside in-scope CSDs,” says Tuffy. “The arguments against it remain the same, but they now have more real-world experience to point to.”

Spot the difference

The industry's current rhetoric implies something more than just a short delay to the buy-in rules. On January 22, a group of 14 trade associations, including ICMA and Isla, submitted a letter to Esma calling for a staggered phase-in, with the penalties for late settlement applied first and mandatory buy-ins postponed until later.

The separation would provide time to analyse the penalties data and assess the possible impact of mandatory buy-ins. Some hope that if the fines for late settlement lead to a significant enough decline in the number of fails, then the buy-in regime might become superfluous. The trade associations also called on Esma to consider making buy-ins a voluntary option for the



Steven Maijor, Esma

receiving party (as is already the case in some repo and securities lending contracts), with CSDR providing legal guarantees when the option is exercised.

Maijor curtly rebuffed those calls in his April 16 letter. He pointed out that the regulatory technical standard on settlement discipline was adopted in May 2018, meaning the industry had more than two years to prepare, even before the five-month delay announced in February 2020.

“There will be a renewed push to discuss worries around CSDR, its impact on market liquidity, and whether bond trading in particular will move outside in-scope CSDs”

Sean Tuffy, Citi

On the idea of voluntary buy-ins, Maijor was equally blunt: “The mandatory nature of the buy-in was a clear policy choice by the co-legislators when adopting the CSDR and it is meant to protect the securities buyers,” he wrote. “In our view, it is premature to consider further action at this point in time, in the absence of concrete evidence following the implementation of the buy-in requirements.”

But the timing of the letter has led some to speculate about whether it was drafted before the full extent of the coronavirus disruptions became clear. “Protocols and the need for internal approvals mean the letter probably wasn't necessarily written with the full context of Covid-19, and there is a valid argument that the world has changed and it is worth revisiting that letter and Esma's position,” says Tuffy.



Sean Tuffy, Citi

He reckons Esma might still be “amenable” to a further delay in light of the prolonged coronavirus lockdowns, citing the regulators' willingness to postpone the start of the European Securities Financing Transactions Regulation and the next phase of the initial margin (IM) rules for non-cleared trades.

NatWest's Lloyd also notes the similarities between the buy-in rules and the fifth phase of the non-cleared margin rules – including the mass repapering of contracts and the need to alter relationships with custodian banks.

The key difference is that the IM deadline was in September 2020, meaning much of the compliance effort would have coincided with the height of the Covid-19 crisis in late March and early April. The CSDR deadline of February 2021 may not have felt so pressing.

“Each regulatory milestone has to be thought through – who is it impacting, how much of the work could be done already, what is the lead time for doing that work?” says Lloyd. “We will see how it plays out; a lot of these things are up in the air at the moment, a lot of it comes down to how long the lockdown lasts.”

In general, he says, European regulators want to “get on with” the implementation of CSDR – which was certainly the tone struck by Maijor's letter. However, he argues the industry's proposal to stick with the current timeline for late settlement fines while postponing mandatory buy-ins is a reasonable compromise.

“One possible option is the phase-in of the fines, then the buy-ins. You could still keep the [February] deadline then, but show a little pragmatism given how many questions there still are around the buy-in process,” says Lloyd. ■

Previously published on Risk.net

¹ ICMA (November 2019), Mandatory buy-ins under CSDR and the European bond markets, <https://bit.ly/3gOgGk7>

Impact on CCP margin levels and the problems of procyclicality

As higher initial margin demands reduce procyclicality, central counterparties must strike a balance between countercyclicality and sensitivity to risk. By Alexander Campbell

Initial margin (IM) policies at central counterparties (CCPs) around the globe are under heavy fire. A spate of major margin breaches since the coronavirus hit has hastened calls to hike IM requirements – existing base requirements and ongoing scrutiny from regulators notwithstanding. Sudden spikes in IM demands on Nikkei futures and various benchmark oil contracts are among the many stark examples of margin hikes compounding the stress of volatile conditions.

Higher IM demands would reduce procyclicality – the tendency for margin levels to rise in times of crisis that can increase the strain on clearing members. But CCPs are having trouble striking a balance between countercyclicality – or anti-procyclicality – and sensitivity to risk.

A new paper, published in the *Journal of Risk*, and co-authored by Pace University's Elena Goldman and the Bank of Canada's Xiangjin Shen, offers cautionary advice for setting parameters.¹

"Overall, during market stress, procyclical margins can be destabilising for the members and, in turn, for CCPs," says Goldman.

The best IM model would include maximum and minimum limits on margin level and an asymmetrical reaction to risk, their research suggests.

In their research, Goldman and Shen used price data for the S&P 500 (SPX) and Toronto Stock Exchange (TSX) indexes to backtest variations on the commonly used Garch (generalised autoregressive conditional heteroscedasticity) approach, which forms the bedrock of most CCPs' value-at-risk models.

IM models seek to capture price moves in an underlying instrument by assessing its VAR over a given period to a specified coincidence interval. An instrument's VAR is, in turn, calculated using an approach such as Garch or an exponentially weighted moving average.

Using a threshold Garch approach produces an asymmetrical response to returns: large negative returns have more effect on conditional variance than equally large positive returns, reflecting the behaviour of equity VAR in practice.

And, says Goldman, since adapting the model to reflect this requires adding only one or two extra parameters, "estimation takes almost the same time as Garch".

Floored

While CCPs do not generally reveal the details of margin models, they are mandated by the European Markets Infrastructure Regulation (Emir) to use margin floors. The Emir rules offer three options. In the first, CCPs may apply a margin buffer of at least 25% of calculated margin, which can be drawn down in periods of stress. Alternatively, they may weight observations from stressed periods of the lookback window to at least 25%. Or, they may establish a floor by calculating volatility over the last 10 years.

In practice, according to a 2015 survey of Emir implementation by the European Securities and Markets Authority (Esma), 45% of CCPs use the 25% margin buffer; a further 45%, the 10-year lookback; and only 10% choose to weight stressed observations.²

"Overall, during market stress, procyclical margins can be destabilising for the members and, in turn, for CCPs"

Elena Goldman, Pace University

Backtesting a calculation method with margin caps and floors smoothed out the VAR spikes that financial unrest produced over the 2006–16 period, the study found. It simulated a model in which the cap and floor were estimated, using a rolling window of observations and allowing the margin to rise under control during market stress.

At times of low volatility, the floor held margins around the 29th percentile of the unrestricted distribution for the SPX – similar to the 25th percentile floor recommended by Emir, the researchers point out.

The authors reflect the importance of both risk sensitivity and countercyclicality by devising a loss function that represents the trade-off between the two. A highly risk-sensitive margin would also be highly procyclical, as it would produce rising margins as soon as risk started to increase – the loss function incorporated measures of margin shortfall and margin variability.

Unrestrained VAR represents the highest sensitivity – introducing caps and floors for margin makes the model less cyclical. CCPs could use the loss parameter to set their own appetite for sensitivity and countercyclicality, the paper suggests. The authors say that "speed limits" on how fast margins can be raised would also help, although the model found that ceilings and floors had a more significant effect on losses, with some mitigation of procyclicality.

The research's approach should also work for other asset classes, says Goldman, explaining that equity indexes were used because of the availability of high-frequency price information.

She warns, however, that other assets behave differently in response to negative news: "[The] asymmetric effect of the news that we found for equity indices may not be pronounced for currencies and commodities, and may have the opposite effect for credit default swaps [CDS]. For example, if CDS spreads go up, it will result in higher volatility than when [they] go down, so the asymmetric effect here works the opposite way." ■

Previously published on *Risk.net*

¹ E Goldman and X Shen (April 2020), *Journal of Risk*, *Procyclicality mitigation for initial margin models with asymmetric volatility*, www.risk.net/7536071

² European Securities and Markets Authority (August 2015), Emir review report no.2 – Review on the efficiency of margining requirements to limit procyclicality, <https://bit.ly/2Awn2e0>

A new risk era

Recovering stronger from the pandemic

Jose Ribas, global head of risk and pricing solutions at Bloomberg, discusses how risk management at financial institutions is changing in the wake of the pandemic and the subsequent volatility, the role of regulations and how technology can help risk teams be more agile



Bloomberg

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What does the Covid-19 pandemic – and the resulting volatility and market stress – reveal about the robustness of financial institutions' risk systems?

Jose Ribas: The level of volatility and trading activity seen over a short space of time in March was unprecedented. Negative interest rates, negative commodity prices and price volatility required risk management teams to act more swiftly and run valuations and risk assessments more frequently. The rising credit risk triggered margin calls, credit valuation adjustments and end-of-day valuations, and resulted in a greater number of disputes. All of this activity stressed systems and teams. The need to respond rapidly and manage risk with greater intraday frequency has become fundamental to the market.

Firms also had to ensure, with very short notice, that their systems could support the majority of their workforce working from home. For risk managers, the challenge is that they need to understand their exposure – and whether or not limits have been breached – at any time. Huge computing power is needed to calculate the portfolio risk numbers on an intraday basis. With teams working remotely, there is greater potential for gaps to occur, as firms are still required to record conversations and provide a solid audit trail. We saw a spike in demand from Bloomberg customers asking us to provide quick solutions to aid this type of business continuity.

And this is not just happening at financial firms. Corporations that use hedge accounting or, for example, hold oil contracts also need to hedge their exposures. During the worst of the volatility, what they believed were eligible or effective hedges became ineffective. They are now also paying more attention to the heightened risk of defaults in their customer base and supply chains.

Risk management is taking centre stage at board meetings, with chief risk officers (CROs) and risk managers in the spotlight, as firms realise they must respond rapidly. If you have four systems, it takes time to reconcile positions and risk numbers – the process won't be as efficient as using a single system with a streamlined workflow that provides consistency between the front office and risk functions. Implementing new models to deal with unexpected market events – such as low or negative oil prices – is also quicker and easier if you don't have multiple systems.

Some of the regulations prompted by the global financial crisis that began in 2007–08 are still being implemented. Will another wave of regulation help or hinder firms' risk management efforts?

Jose Ribas: Regulators have been fairly accommodating in the current circumstances. They have pushed back deadlines for some regulations such as the Fundamental Review of the Trading Book (FRTB), and they have been more lenient in terms of capital requirements to make sure there's credit available. But that doesn't mean firms have stopped focusing on implementation. We haven't seen any significant delays from customers in terms of planning, it just gives them a bit more breathing space to channel their resources effectively.

While some firms focus on regulatory compliance, many go above and beyond regulatory standards in terms of their own processes and risk controls. Some also seek to stay ahead of the game with improvements to models, metrics and analytics. For example, firms that didn't have models to price commodities with negative rates will make sure they have one ready for next time rather than wait for the regulatory guidance.

Going forward, regulators may also start asking questions around firms' response times during the crisis. They could inquire about value-at-risk (VAR) limits that have been breached and introduce new measures accordingly. Regulatory stress tests are already taking a more forward-looking approach, so we may see new scenarios introduced to explore how well and how quickly firms are positioned to respond.

How is the Covid-19 pandemic changing how firms manage data for regulatory compliance and reporting?

Jose Ribas: Data is fundamental to effective decision-making, and in crisis situations there is increased demand for quality data delivered at speed. Bloomberg saw a spike in the volume of customers accessing data across all key feeds. Firms need clean data on their positions and on markets, along with high-quality data for valuation and risk. They also need the right methods to continue to produce arbitrage free volatilities and curves in extreme market conditions. If high-quality data isn't available because of liquidity challenges, firms will need to fill in the blanks using proxy methods. They need to be able to understand relationships between markets and how a particular financial investment has moved compared with others.

In terms of reporting output, while firms need to be able to make swift decisions on risk, they must also ensure that trading data is reported correctly. This requires validation processes and thus good technology. Transparency on the data and trust in the numbers is very important because firms are responsible for the output.



What questions should CROs be asking as they conduct postmortems on their crisis response and risk management practices?

Jose Ribas: CROs will be looking at VAR limit breaches, and at what can be done to get a better intraday, real-time or forward-looking view of exposures. Did they have access to the data they needed in order to make the right decisions at the right time? When these sorts of volatility levels come to the markets, latency is a real issue.

CROs should evaluate how long it takes them to gather data and reconcile systems, and evaluate how they could react faster, adjust hedges and identify sources of liquidity.

They should also consider how risk limits should change when the volatility of the market is changing. Do they need more agile portfolios? If you trade in and out of a position, you will have a higher cost of trading. If you trade less frequently, you may have more losses.

CROs may also look to drive efficiency in risk processes by outsourcing certain tasks, such as independent valuations, application programming interfaces (APIs) supporting certain tasks for the Libor transition or credit modules. What solutions do they want to build and maintain in-house, and what solutions and services can they outsource in order to focus on the decision-making?

While the role of the CRO has grown in importance since the last financial crisis, now we may see something similar happening with chief technology officers (CTOs). Firms increasingly realise they need to focus on streamlining systems – from pre-trade to trade execution, risk management, reporting and communication. How much time is spent reconciling because a firm has multiple systems? Depending on their size and the complexity of their operations, firms can have anywhere from a few to hundreds of systems. CROs and CTOs may need to assess if they are investing in the right technology and working with the right partners.

What do you consider the most likely source of the next financial crisis, and how can firms improve their ability to prepare and respond?

Jose Ribas: For now, risk teams will have to focus on reviewing how the economic impacts of the pandemic – and the fiscal and monetary policies put in place to deal with it – will affect their risk scenarios and hedging strategies.

Looking ahead, while innovations in technology – such as robotic process automation and artificial intelligence – are good and necessary for the market, they need to be properly risk managed. You need strict rules governing these systems, someone validating the decisions and stopping the chain of wrong signals from escalating.

People sometimes question investment in risk technology and infrastructure, but it pays off. We have invested in making our own systems more robust; as a result they coped well despite volumes and volatility going up three or fourfold.

One of the lessons the market is learning from this pandemic is that having contingency plans and resources in place for more extreme scenarios is essential, and that using a reliable third-party provider makes sense if you don't have the time, budget or resources to go at it alone.

While regulators have conceded ground on the timeline for several key legislative reforms, they have stressed that firms' existing compliance responsibilities remain a priority. How can risk managers strike the right balance between firefighting, business as usual and strategic planning?

Jose Ribas: While crises create major challenges, they also force you to break out of your usual routine, and think and act differently. The 2007–08 crisis demonstrated to firms that trying to do everything in-house is not cost-effective and delays or reduces the time available for decision-making and planning.

As a result, firms re-examined their buy-versus-build approaches and started using more third-party providers. This trend is set to grow, with firms either continuing to review existing systems or considering more flexible solutions, such as APIs and services, to complement these. The events of the past few months have also reminded firms that having reliable partners and suppliers during difficult times is very important.

Notably, we see firms looking for more sophisticated credit and intraday risk tools, and automation solutions that remove lengthy manual processes and allow risk managers to spend more time on complex tasks that require human decision-making. Integrating front-office and risk management systems also frees up time by reducing reconciliation issues.

While there are still firms that are cloud-averse and prefer to keep all systems and servers on their own premises, the current situation with employees working remotely will likely change that thinking. All of these aspects will help firms focus on tactical as well as strategic goals.

How else will Covid-19 affect how risk teams operate in the future?

Jose Ribas: I think, across all teams, there will be greater awareness and understanding of colleagues' personal circumstances, needs and mental wellbeing, which can only be a good thing. Working from home also forces team members to focus on improving how they communicate, which should help foster better collaboration. ■

Buy-side trading strategies amid the pandemic

Citi's Itay Tuchman explores the March madness brought about by the Covid-19 pandemic, as trading rooms went virtual and central banks stepped up – however, some platforms didn't fare so well. By Lukas Becker

The coronavirus has upended life all over our planet – in foreign exchange trading, as elsewhere. Banks have become Amazon-style distributors of computer hardware; usually crowded trading floors lie deserted; home-working salespeople and traders are juggling the 4pm currency fix and the 4.05pm grocery delivery.

It hasn't been straightforward for anyone, but when you employ around 1,000 front-office staff across more than 70 countries – as is the case for Citi – it becomes a huge logistical challenge.

"We delivered hundreds of work-from-home setups to our FX staff all over the world. It seems easy, we work with computers all the time, but we didn't just pluck them from the dealing room and hand them to people – it required an incredible amount of coordination to source and deliver two or three screens, communication tools and other computer equipment for people," says Itay Tuchman, global head of FX at Citi.

After watching lockdowns spread across Asia, at least the bank was prepared. Like many of its peers, Citi first split staff between its main dealing rooms and disaster recovery sites, and then spread the dealing room staff across multiple floors to ensure social distancing.

The spreading pandemic soon forced everyone to go further. Anticipating the need for mass home-working, as in Hong Kong, Citi started ordering the necessary hardware and – by mid-March – the bank was sending home the bulk of its FX staff globally. Most are still there. As of a few weeks ago, 68% of Asia staff were working at home, along with 84% of the business in Europe, the Middle East and Africa, 97% in Latin America and 98% in North America.

It was not a straightforward transition. A trader can't do the job using a single laptop or iPad – or can't do it properly, at least – and Tuchman believes the Street-wide switch from office to home was one of the main reasons liquidity was disrupted in March.

"I would get messages from traders saying liquidity was really poor, that it seemed like a lot of banks were struggling with their work-from-home setup," he says.



Itay Tuchman

"Clients were also establishing these processes at different times over the past couple of months, so it took a while for the market to return to what I would call a highly functional state."

Tuchman claims a smoother transition to home-working was one of Citi's advantages in the first quarter, when the bank posted a 37% year-on-year rise in fixed income revenues, with a particular nod given to the currencies business.

On the surface, all is well then; but behind the scenes, there have been unique challenges. Traders are used to being able to chat with colleagues at neighbouring desks about market conditions, but working from home obviously makes that tricky. To recreate the buzz, Citi has been using what it calls 'virtual dealing rooms' – essentially an always-on video call – to keep teams connected and talking throughout the day.

"We noticed right away that we would need that adaptation. And so we started to experiment with those kinds of things to make up for it," says Tuchman.

Other challenges arise from the sometimes awkward collision of office and family life. Staff are no longer coming into the office at 7am and leaving at 6pm without disruption – they might need to take an hour in the morning to set their kids up with online schooling, or to collect a grocery delivery.

Tackling those aspects of home working requires co-ordination. For instance, a salesperson might need a colleague to cover from 8:30am to 9:30am while getting their kids set up for the day. Citi tried to tackle this collectively.

"I don't think any of us have thought: 'Your family is your problem'. It's quite the opposite: your family and making it work is our problem," says Tuchman.

Perhaps the old African proverb can be adapted: it takes a Citi to raise a child.

Communication now takes up the largest part of Tuchman's day, whether that's calling clients and staff, setting up team chats or dropping into other people's team chats. He has also been organising blogs, podcasts, roundtables, virtual roundtables and daily thought leadership calls for clients – content the bank would normally have saved for a face-to-face conference or seminar, but has now begun breaking up and blasting out virtually.

One direction

The more traditional aspect of the crisis, of course, was a period of extended volatility. Tuchman says the business initially focused on de-risking its existing books to ensure it had the capacity to quote two-way prices as the stress continued.

In the days and weeks that followed, differences between dealers quickly became apparent, he claims. Put simply, Tuchman argues some dealers 'internalise' their risk – holding it with the aim of finding an offset within their own franchise, and minimising market impact as a result. Others are so-called 'externalisers'.

"There were times we saw – in major currencies – visible external liquidity that was 80–90% less than January's average. At a time like that, you need to be able to rely on a bank that can provide you with its own principal liquidity," he says.

Clients' execution strategies through March varied. Wider bid/offer spreads tempted some to opt for passive algorithmic execution, in which orders sit on central limit order books until they are lifted by other market participants – the client captures the spread rather than paying it, but has to endure minutes or hours of price risk. Others wanted the comfort of executing in one shot, at a price agreed over the phone.

While spreads widened and volumes increased significantly, dealers weren't able to sit back and let the revenue roll in, says Tuchman. Internalisation of flows is a key strategic plank for many large FX dealers, allowing the liquidity provider to minimise its hedging needs – and costs – by matching off client orders. In theory, a dealer with lower hedging costs is able to offer tighter spreads.

But orders in March were more directional than usual – with many market participants looking to sell a range of currencies against the US dollar – which reduced the amount of offsetting flow. Citi's hedging needs increased as a result.

"When I look at our internalisation statistics electronically – sure, we did more external hedging during March than we would have in pre-crisis environments. But our internalisation rates were still very high. So that dip was not what I would call game changing, we still internalised a huge percentage of our flows," he says.

In the options business, Citi initially saw clients looking to take off exposure, particularly those that had been selling options in the extended low-volatility regime that preceded the crisis. Since then, hedgers have re-emerged as a significant source of demand.

"We're starting to see a lot of investors who had not thought about hedging using FX options now buying them for tail protection. It's a return of that kind of activity after a number of years where folks just didn't even pay very, very low levels of premium for options for asset protection, given the low-vol environment," says Tuchman.

While some corporates took off hedges with positive mark-to-market values to generate some cashflow, most are still in the "digestion" phase, he says, and are thinking about their business and capital mix.

Tuchman believes the Covid-19 episode will accelerate some macro trends, in particular the pace of deglobalisation seen in recent years. Citi is expecting to see more companies move in this direction – possibly choosing to do more manufacturing closer to home, for example.

"A US corporate that decides to move something from country A back to the US will have a fairly material set of FX transactions to do," he says.

Swaps stress

After running Citi's FX swap business during the 2008 financial crisis, Tuchman takes a keen interest in the product, which was spiralling towards a crisis of its own in March.

As spreads on FX swaps widened and liquidity evaporated, Tuchman says he feared a funding feedback loop could develop in the way it did 12 years ago.

Index-tracking asset managers rely on FX swaps to avoid tracking errors arising from currency movements in bond and other portfolios, tweaking the positions and rolling them over each month to coincide with index updates. In March, investors started fretting about their ability to roll those FX swap hedges, making them less willing to hold the underlying foreign currency assets.

As the 2008 crisis unfolded, Tuchman says dealers had to educate central banks about the critical role played by the FX swap market in an environment where other funding markets, such as commercial paper, were completely shuttered.

Since then, he says, central bankers have a keener appreciation of the swap market's workings, including the concentration risks associated with month-end flows. This allowed officials to engage quickly as the crisis took hold, says Tuchman. One fruit of that was the US Federal Reserve's dollar swap line with central banks, which is credited with stabilising funding markets in March.

"I cannot give enough credit to the Fed and other major central banks around the world for how quickly they acted to make sure – as far as possible – that the feedback loop of a funding crisis was not added to the list of enormous humanitarian and economic challenges facing the world in the months and years ahead," he says.

The bank worked closely with clients on when and how to roll their hedges, the general advice being to avoid the last day of the month as much as possible. While the problems in the FX swap market in March stemmed dramatic changes in asset valuations, going forward Tuchman says clients may start thinking more carefully about how they manage their rolls, and there may be more interest in more flexible roll timings.

The bad kind of recycling

One silver lining of the March meltdown is that dealers now have a rich set of data on the performance of various trading platforms during a period of intense stress. This will give banks more ammunition in their ongoing scrap with platforms over fragmentation and fees.

PIPS AND POINTS

98%: Percentage of Citi's front-office FX staff in the Americas working from home.

37%: Citi's year-on-year rise in fixed income revenues in Q1.

1,000+: Number of front-office staff in the FX business at Citi.

50+: Number of FX platform vendors the bank was connected to at one point.

Citi has been public about its attempts to benchmark the 50-odd FX trading and aggregation platforms it is currently connected to, with a view to ditching those that do not meet its expectations on liquidity, transparency, stability and value for money. The bank is currently crunching the numbers, and Tuchman expects to see clear differences in performance.

"It will come out that some of these platforms will have performed brilliantly and done a great service for clients, and some will have been seen to have very poor liquidity, poor service or issues with stability or latency," he says.

He insists the bank is not trying to shut off client choice, or limit competition. "But if the sixtieth or seventieth vendor is just recycling very poor liquidity that's already been recycled a few times, what value is it really creating?"

Clients have been keen to see the results, he says. Some have also been asking for Citi's views when deciding whether to move their liquidity from one vendor to another.

Where clients are using a platform that Citi plans to cut, Tuchman says the bank has explained its reasoning, often arguing that the client isn't getting the best of the bank's liquidity through that venue. Clients then ask for Citi's advice on which platforms to use.

Vendors that make the cut will not necessarily be the most-established players – Tuchman says there is plenty of room for new or disruptive entrants.

"I would not interpret this as 'new members need not apply'. We want innovation, but it has to be good," he says.

There is a caveat, though: "It can't be built on a threadbare infrastructure. We can't have this beta-version thinking that sometimes dominates Silicon Valley – just get something out there and then fix it later – for such an important part of the financial markets ecosystem." ■

Previously published on Risk.net



Crisis exposes flaws in US financial stability regime

Former US Federal Reserve Board chair Janet Yellen calls for reform after a failure to curb corporate leverage ahead of Covid-19.
By William Towning

The build-up of record corporate debt and leverage prior to the Covid-19 lockdown means many US companies saddled with additional lockdown-induced debt amid weakened earnings look set either to default or file for bankruptcy protection in the coming months. This expected wave of impaired corporate credit will place a major

strain in the US banking and financial system, according to former central bank officials – making a ‘V-shaped’ recovery, predicted by many policy-makers in March, far less likely.

It also highlights the failure by US authorities to tackle rising corporate debt levels in the lead up to the crisis, in part due to the fragmented nature of the country’s macroprudential oversight regime.

“I have been worried for many years about this build-up in corporate debt,” Janet Yellen, former chair of the Federal Reserve, says in an interview with *Risk.net*’s sister publication, *Central Banking*.

“Now we have a significant shock that may pressure many non-financial corporations to restrain investment and employment as they try to work off their debt overhangs.”

Corporations that are unable to avoid defaulting on their debt will impose losses on creditors, suppliers, customers and owners. Since the start of March, the US has experienced 30 defaults, a total of 44 for 2020. This is already roughly the same number of defaults in all of 2018 and 60% of 2019’s total. Rating agencies are expecting the number of defaults, particularly within the leveraged loan market, to continue growing this year and in 2021, and likely surpass record levels seen in 2009.

The Fed and the Financial Stability Oversight Council (FSOC) warned that excessive growth of corporate debt could amplify a downturn on a number of occasions leading up to the current crisis. The 2019 *Shared national credit review* and *Financial stability report* both discussed the risks that high levels of corporate debt pose during a downturn.¹ Fed chair Jerome Powell, governor Lael Brainard and Federal Reserve Bank of Boston president Eric Rosengren also warned such debt could exacerbate a recession.

International bodies such as the Financial Stability Board (FSB), International Monetary Fund and the Bank for International Settlements have also reached the conclusion that corporate debt levels represented an increasingly troubling downside risk to economies – and not just in the US.^{2,3,4}

“A sudden tightening of financial conditions could interact adversely with the high levels of corporate and public debt, and create a feedback loop that would also weigh on real activity and job creation,” former IMF managing director Christine Lagarde said in opening remarks on the fund’s 2019 Article IV consultation with the US.

Why, then, was action not taken to curb excessive lending?

Many experts say macroprudential tools are not clearly defined in the US and no regulatory agency has explicit responsibility for financial stability. The FSOC is tasked with raising concerns about financial stability threats, but has demonstrated a lack of willingness to tackle any major problems, particularly during the past few years. Indeed, the concerns raised at the moment are reminiscent of those made following the 2008 financial crisis, after which Congress passed sweeping reforms under the Dodd-Frank Act and established the FSOC. The new body was meant to guard the US against systemic risks that posed a threat to financial stability, but Democratic senator Sherrod Brown, who is also ranking member of the Senate Committee on Banking, Housing and Urban Affairs, recently criticised the council for failing to intervene in corporate debt developments ahead of the crisis.

“This inaction puts the economy in a precarious position at just the time when faith in the stability and resiliency of our financial markets is most important,” he said in a March 4 letter to the current FSOC chair, US Treasury secretary Steven Mnuchin.⁵

Need to know

- Total outstanding US corporate debt now stands at more than \$10 trillion, more than 50% higher than in 2008.
- US authorities lacked the macroprudential tools necessary to prevent an excessive build-up of corporate debt in the lead-up to the Covid-19 pandemic, according to former Fed officials.
- Regulatory efforts to rein in leveraged lending and collateralised debt obligations between 2013 and 2015 were overturned by the US Government Accountability Office and the courts.
- Some suggest adjusting the membership rules and mandate of the Financial Stability Oversight Council, and making the chair independent of the US Treasury.
- Others say the Fed should have powers comparable to the Bank of England’s Financial Policy Committee, which can set debt- or loan-to-income ratios.
- Improved governmental data sharing could also make it easier for US regulators to identify and monitor emerging threats.

The expected wave of defaults look set to put financial stability back in the spotlight. With interest rates now remaining at the effective lower bound until inflation rises back to its 2% target and unemployment returns to normal levels, Yellen – who ran the Fed between 2014 and 2018 – says Congress “must rethink the financial stability framework and give regulators the tools necessary to address these risks”.

Macroprud powers for regulators?

Yellen says there must be a shift to ensure that regulators are not only responsible for curbing developments that pose a threat to the banking system but also to the economy more generally.

David Wilcox, former director of the Fed’s research and statistics department, echoes Yellen’s concerns: “The macroprudential toolkit absolutely needs to be enhanced in the US – it is pretty meagre compared to the toolkit that’s available in other countries like the UK.”

Both former Fed officials recently raised similar concerns in connection to the possibility of the Fed adopting a price-level target – which may keep rates lower for longer – when it concludes its monetary policy framework review in June. They have said that in a perfect world, both a price-level target and a reform of the financial stability regulatory framework would go hand in hand.

But reforming the US regulatory landscape is no easy task. Many efforts during past few decades

have petered out as the scale of the task, political obstacles and an unwillingness among regulators to cede powers have conspired to block most meaningful change – the only real exception being the elimination of the Office of Thrift Supervision (a unit under the US Treasury) in 2011.

Donald Kohn, former Fed vice-chair and current external member of the Bank of England’s macroprudential arm, the Financial Policy Committee (FPC), suggests there may be some ways to strengthen the current framework: “There are things you can do to the FSOC to give it more focus, more authority and be a little less political.”

He suggests that adjusting the membership rules for the FSOC, giving regulators a secondary financial stability mandate, and improving governmental data sharing might help regulators form better decisions. Kohn also says that appointing an FSOC head who is independent of the US Treasury might also help make the organisation less political.

Corporate debt since 2008

The failure by the FSOC and US regulators to reduce risks associated with corporate debt highlights the weakness of the current system. Total outstanding corporate debt in the US now stands at more than \$10 trillion, a record high, and more than 50% higher than in 2008. Since the start of 2008, corporate debt has grown 2.5 percentage points faster than GDP on average (see figure 1) and is now equivalent to roughly 50% of last year’s economic output in the US.

The Fed highlighted the issue again in its May 17 *Financial stability report*, noting the ratio of debt to assets for all publicly traded non-financial firms is 40%, close to the highest levels of the past 20 years (43% in 2015–16).⁶

The fastest-growing corporate debt instruments over this period have also been in the higher-risk categories. “Over the past two years, the firms with the most rapid increases in their debt loads have higher leverage, higher interest expense ratios, and lower cash holdings,” the Fed said.

Leveraged loans – those made to highly indebted borrowers with low credit ratings, or loans with high credit spreads – grew by 20.1% in 2018, 4.3 percentage points faster than the average since 2000, the report shows. The amount of outstanding leveraged loans totalled \$1.1 trillion in 2019, down from a record high \$1.2 trillion in 2018, and up from roughly \$500 billion in 2008.

The growth of the leveraged loan market has also coincided with a worsening of credit standards since 2010. “Credit standards for new leveraged loans appear to have deteriorated further over the past six months,” the Fed warned on May 17. As of the first quarter of 2019, over 40% of leveraged loans were made to companies with debt-to-earnings (before interest, taxes, depreciation and amortisation) ratios of more than six times, up from roughly 30% in 2018.

A significant majority of the market now consists of ‘covenant-lite’ loans, meaning lenders lack traditional authority to restrict future borrowing or dividend payments. In the event that firms borrowing on these terms default on the debt, the amount investors will be able to recover is also expected to be much lower than traditional loans.

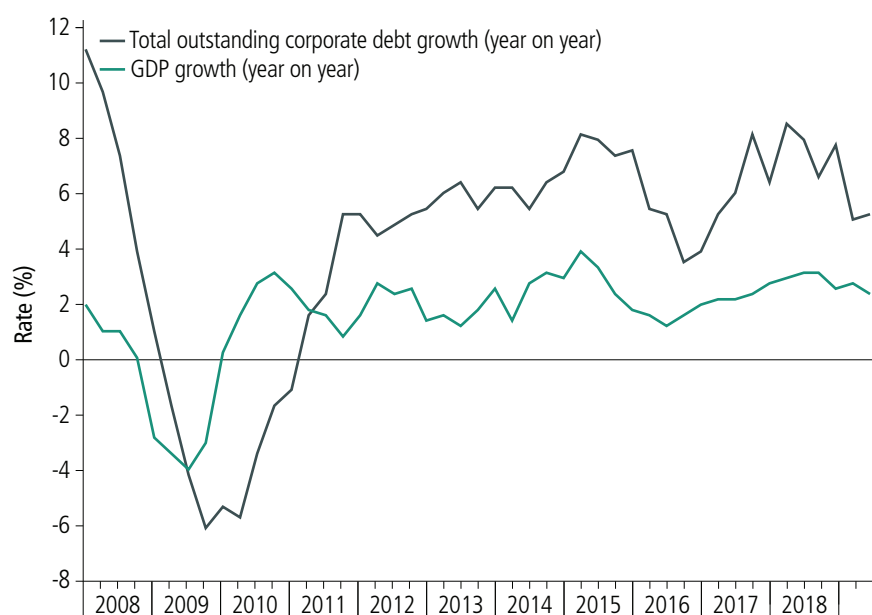
Collateralised loan obligations (CLOs) – syndicated loans repackaged and sold as securities in tranches – also reached record highs of \$600 billion in 2018, doubling since 2008. The collateral quality underlying a CLO is typically lower than that represented in the global leverage loan market, with close to 80% made up of loans rated highly speculative or lower, compared with roughly 60% in the global leveraged loan market, the FSB said in 2019.

The underlying loans are also heavily concentrated in the most indebted firms. The top five US firms that borrow the most feature in 80% of CLOs, and the top 50 borrowers in 90% of CLOs, the FSB said.

US regulators have taken steps to address the risks emerging from leveraged loans and the CLO market in recent years, but on both occasions have been thwarted by lobby-backed legal and Congressional pushback.

There are widespread concerns that the increase in borrowing over the last several years has not been used to finance productive investment spending, but rather for stock buy-backs and to pay

1 US corporate debt and GDP growth



Source: Federal Reserve Bank of St Louis

dividends. The weak covenants have also attracted creditworthy firms to tap into the market to finance leveraged buyouts – rekindling memories of a pre-2008 crisis boom in leveraged buyouts, which ended with several firms going bust.

The leveraged loan market has been particularly hard-hit by the financial fallout of the coronavirus, with the average price of loans falling to \$0.76 to the dollar on March 24, its lowest level since 2008, when prices fell to \$0.61 to the dollar, Bloomberg data shows. It has since recovered to \$0.86 to the dollar, but the drop suggests investors are concerned that firms may struggle to meet their obligations.

Risk of default

Firms with heavy debt loads will likely struggle the most during the lockdown period, as they may not be able to lower their bottom-line costs, or their cash burn rate, in a significant way. They may also have less capacity to tap into the debt markets to shore up their liquidity positions.

American Airlines, for example, pays roughly \$20 million per week in interest expenses, and there is significant uncertainty surrounding when pre-pandemic revenues will return in the aviation sector. In a recent earnings call, American Airlines said it would spend cash at a rate of \$70 million per day in the second quarter. The company's five-year credit default swap (CDS) spread has widened by over 7,500 basis points to 7,989bp since the start of March, Bloomberg data shows – a sign that investors are deeply worried about the creditworthiness of the company.

Firms such as Royal Caribbean International and Ford Motors are in a similar position, spending on average \$7.8 million and \$20 million per week respectively in servicing debt over the last year. These firms' CDS spreads have risen from 207bp to 1,508bp and 238bp to 680bp respectively since the start of March, Bloomberg data shows.

In a May 5 filing with the Securities and Exchange Commission (SEC), the world's third-largest cruise line, Norwegian Cruise Line, said the challenges it had experienced in accessing funding had "raised substantial doubt about the company's ability to continue as a going concern, as the company does not have sufficient liquidity to meet its obligations over the next 12 months". The average CDS spread for the S&P 500 Index widened by nearly 50% from February 1 to May 1. An index of CDS spreads based on 125 investment-grade corporations has risen 80% over the same period. And during the last week of April and first week of May, four US corporations defaulted: contract drilling service provider Diamond Offshore Drilling; healthcare service provider Envision Healthcare; bakery goods producer CSM Bakery Solutions; and consumer products firm J.Crew Group.

"We have a significant shock that may pressure many non-financial corporations to restrain investment and employment as they try to work off their debt overhangs"

Janet Yellen, former US Fed chair

"There is no question, given where we are now, that we would have been much better off with less corporate debt in the system," says Frederic Mishkin, former Fed governor. "We have basically done nothing in terms of creating the actual tools to do macroprudential supervision."

Intervention thwarted

The Fed, the Office of the Comptroller of the Currency (OCC) and the Federal Deposit Insurance Corporation (FDIC) tried to intervene in the leveraged lending market with a series of guidelines for lenders from 2013 to 2015. However, industry groups and some members of Congress, disapproving of the regulators' intervention, pushed back and overturned their efforts.

The regulators' guidelines were issued and were aimed at assisting financial institutions by providing leveraged lending to creditworthy borrowers. And regulators advised banks against making loans to companies with debt-to-earnings ratios greater than six or those that could not pay down debt quickly.

But the investigative arm of Congress, the Government Accountability Office (GAO), answered calls from Republican senator Pat Toomey in March 2017 to review the guidance, on the grounds that it was being enforced as a rule, rather than advice. If this was the case, he argued, the guidance should be subject to the Congressional Review Act – the legal regulatory rulemaking process requiring a comment period and Congressional approval – as with any other regulation. Lobbying efforts also came from the banks themselves, arguing that the guidance was too opaque and too broad.

"There was a lot of pushback from Congress, and eventually the restrictions that were in place – mild as they were – were eliminated," says Yellen. "I would have been very much in favour of addressing it directly, but we didn't have the tools."

The Fed has the authority to intervene under the Dodd-Frank Act, as long as the risks pose a threat to the banking system. But since banks were not warehousing a significant portion of leveraged loans on their balance sheet, and instead were offloading them to the non-bank sector, there was little ground for the Fed to step in to strengthen the underwriting standards on a formal basis, Yellen says.

In October 2017, the GAO ruled in favour of Toomey's concerns, and following the new administration's appointment of OCC chief Joseph Otting, the regulator appeared to have little appetite for going through a rulemaking process that would constrain risk-taking by banks.

"We could be regretting over the next couple [of] quarters and years that the supervisory guidance didn't turn into a regulation and was in effect removed," says Kohn. "Businesses may well be less equipped to be there when the public health situation turns around."

The growth in leveraged loans slowed significantly to zero by the beginning of 2017, but has since rebounded to levels roughly the same or higher than before the guidance was enforced, the Fed's recent report shows.

CLO rules face lobbying

Similarly, measures to slow the growth in the CLO market also faced pushback. In October 2014, regulators implemented a Dodd-Frank provision called the 'risk retention rule', which required CLO managers to retain a portion of the issued securities to ensure they had an invested interest in the performance of the product.⁷

The rule included managers of open-market CLOs – which typically act as agents by directing CLO issuers to purchase assets in the secondary market, rather than those already held by the issuing institution. Globally, open-market CLOs form the majority of CLOs, the FSB said in its 2019 report.

The Loan Syndications and Trading Association (LSTA) lobby group, whose board is made up of representatives of many large US and foreign banks, was critical of the initial proposal. In a 2013 letter, it argued because open-market CLO managers do not legally own, sell or transfer the loans in the CLO and only direct which assets are to be purchased, they should not be included in the rule.⁸

After considering the group's concerns, however, the regulators explicitly concluded that the risk retention requirements should apply to managers of open-market CLOs.⁹ The final rule placed the "risk retention responsibility on the parties most capable of ensuring and monitoring the credit quality", and open-market CLOs "clearly fall within the statutory definition of 'securitiser'", regulators said.

The LSTA continued to push back against the regulation and in November 2014 turned to the legal system to review the rule. After nearly four years of legal toing and froing, the Court of Appeals for the District of Columbia ruled in favour of the LSTA's claims. The lobbying efforts prevailed and as of April 2018, open-market CLOs were exempt from the rule.

Issues are systemic

While political and industry lobbying played its part in thwarting efforts designed to curb the build-up of leveraged lending and CLOs, the regulatory framework in the US also played its role. It remains highly fragmented, with several overlapping parts, and there is a clear lack of collective or individual responsibility for financial stability (see figure 2). In the absence of a clear authority, actions to limit excess lending, which may have been desirable over recent years, were either not raised or implemented because of co-ordination failures, 'turf' protection and/or data-sharing obstacles present in the current framework.

At the federal level, there are four bank regulators – the Fed, OCC, FDIC and the National Credit Union Administration (NCUA) – the first three of which are macroprudential supervisors. The federal regulators tend to share consumer protection, housing, and safety and soundness oversight responsibilities. The Fed, OCC and the FDIC also have a federal level of systemic risk responsibility for many types of financial institutions. Notably, however, there is no federal-level insurance regulator.

On a microprudential level, there are eight key regulators, each focused on their defined, and often overlapping, mandates. Then, on a state level, there are more than 50 regulators across the country for banking, insurance and securities.

"It is very hard to co-ordinate across all these regulators, and it takes time," says Kohn. "There is a lot of deference and turf protection among them, and data is hardly shared at all."

The complexity of the structure means that, on average, a financial entity is overseen by five different macro- and micro-regulators and one or more state regulators. The most heavily regulated are depository institutions, which are overseen by 12 different macro- or micro-regulators and one or more state regulators across three different areas.

While some observers argue that the fragmentation and shared responsibilities helps promote regulatory innovation and provides checks and balances within the system, the clear lack of financial stability responsibility is a notable deficiency.

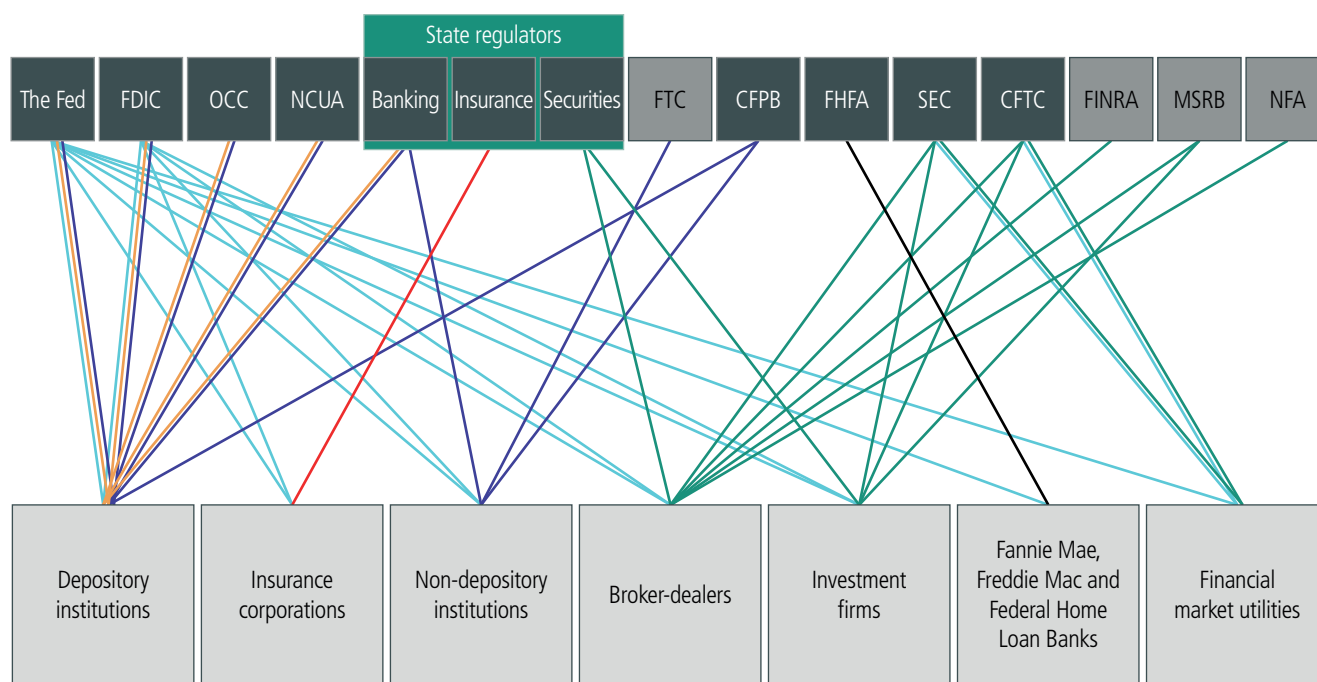
No regulatory agency is mandated to regulate financial stability or has a secondary explicit responsibility for this. Many turn to the Fed to intervene in this area, but it too does not have explicit mentions of financial stability in its governing act, and its responsibility is largely implicit. The Fed's key macroprudential tools are stress-testing and countercyclical capital buffers – with the latter not yet having been deployed.

"I think there is a real problem there," says Kohn, adding that several pushes to reform US regulation over the last four decades ended up "buried in a black hole". The reform efforts typically faced political obstacles and an unwillingness from participants, he says.

FSOC underwhelms

The FSOC was established in 2010 under Dodd-Frank to help solve some of the fragmentation issues by playing a financial stability overlay role. But there is an overriding impression among observers that the council does not use its authority to enforce change and lacks the ability to effectively monitor

2 US financial regulatory structure



- Consumer finance protection oversight
- Systemic risk-related oversight
- Safety and soundness oversight
- Securities and derivatives markets oversight
- Insurance oversight
- Housing finance oversight

CFPB Consumer Financial Protection Bureau
CFTC Commodity Futures Trading Commission
FDIC Federal Deposit Insurance Corporation
FHFA Federal Housing Finance Agency
FINRA Financial Industry Regulatory Authority
FTC Federal Trade Commission

MSRB Municipal Securities Rulemaking Board
NCUA National Credit Union Administration
NFA National Futures Association
OCC Office of the Comptroller of the Currency
SEC Securities and Exchange Commission
■ FSOC members

Source: Government Accountability Office, 2016

emerging threats. Some have also mentioned a lack of willingness and motivation to recommend effective measures.

The FSOC is a governmental organisation chaired by Treasury secretary Mnuchin, and includes the heads of the Fed, OCC, FDIC, Consumer Financial Protection Bureau, SEC, Commodity Futures Trading Commission, Federal Housing Finance Agency and NCUA. The council's mission is to respond to systemic risks and recommend regulatory responses to the appropriate supervisors. A key responsibility is also to identify entities or activities deemed systemically important and designate enhanced supervision.

The regulatory recommendations that the council makes are not binding, however, and do not require regulators to respond. Its process for identifying new threats also relies heavily on qualitative views shared by the regulatory heads, since data-sharing obstacles limit its access to quantitative information gathered by regulatory agencies.

The FSOC tends to include broad-based recommendations in its annual report, but there is a lack of specific and actionable suggestions, Kohn argues. For example, in its 2019 annual report, the council recommended that supervisors "continue to conduct cybersecurity examinations of financial institutions"; and "ensure that the largest financial institutions maintain sufficient capital and liquidity".¹⁰

Since its launch, the FSOC has made very few specific or targeted regulatory recommendations. One of these was in 2012, when it proposed regulations to improve the resilience of money market mutual funds. These took several years to be enforced and, given that the sector required support via Fed intervention again during the current crisis, questions remain over how effective the regulations have been.

In 2013, the FSOC's research arm, the Office of Financial Research (OFR), also raised concerns over financial stability risks in the asset management sector. But after releasing a public notice seeking comment so that it could conduct further analysis on the risks in 2014 – which found evidence verifying the OFR's concerns – the FSOC did not recommend any regulatory action.

Strengthening financial stability

Yellen says that providing the Fed with authorities comparable to the Bank of England's FPC, which can set debt- or loan-to-income ratios, would be an appropriate step to improve financial stability in the US. She believes the Fed should have the powers to intervene in markets if it views a development as a threat to the economy and not just to the banking system.

However, Kohn states that, for the most part, the Bank of England's FPC works by making recommendations, similar to how the FSOC works. FPC recommendations tend to be more effective than the FSOC's because they are agreed among three key regulators – the Bank of England, the Financial Conduct Authority and the Prudential Regulatory Authority – instead of 12 regulators. "It is tough to give Bank of England-type authority to the Fed when regulatory authority is so fragmented in the US," he says.

A potentially more effective solution may be to look at strengthening the FSOC and its ability to provide effective recommendations, Kohn argues. He suggests four reforms that might help.

"The first step ought to consider how to get the FSOC to make better recommendations and a willingness to make recommendations," he says, noting that the members of the FSOC are often not willing to recommend regulations for their own agencies because they will be on the receiving end of pushback from their own staff.

A second element, Kohn suggests, is to broaden the membership of the FSOC. Including a wider set of members from each agency would bring more people into the decision-making process and reduce the frictions within agencies when new financial stability measures are required. Making regulatory agencies more accountable for the overall financial stability of the system would also help reduce this internal pushback to FSOC decisions, Kohn says. He suggests that regulators adopt an explicit secondary goal for financial stability, so that decisions made are required to consider financial stability implications.

A third means to strengthen the FSOC could be to improve governmental data sharing, Kohn says, to enable it to better identify and monitor emerging threats. As things stand, legal and 'turf' barriers prevent data from being shared between agencies. For example, while Kohn held an advisory position for the OFR, researchers in the department were unable to access the Fed's stress-test data to conduct a separate analysis for the purpose of financial stability.

"Organising the data collection of the federal government better, making it a higher priority and making it all compatible, would enable policy-makers to do a better job of figuring out financial stability issues," Kohn says.

A final reform, which could be made – though potentially quite difficult under the current administration – would be to appoint an independent head for the FSOC. Ideally, this would be someone from the Fed or from an independent department of the Treasury who would be able to make decisions independent of some of the political pressures, Kohn says.

"It is tough to give Bank of England-type authority to the Fed when regulatory authority is so fragmented in the US"

Donald Kohn, BoE Financial Policy Committee

Low-rate risk

With interest rates now likely to remain low for years, rather than months, as the Fed aims to keep monetary conditions accommodative to support economic recovery, a robust financial stability toolkit is all the more important.

"It is not at the top of peoples' minds in Congress right now – they are dealing with a very serious immediate situation – but I think that [reforming financial stability] is the right way to go, and my hope would be that people will draw that conclusion and revisit it," says Yellen.

While it is not yet clear how significant the impact of the record levels of corporate debt and leverage will be on the economic recovery from the pandemic, leaving lending and underwriting standards largely untethered for another decade may compound the risks for a future recession.

"It's really important to enhance the toolkit for macroprudential issues precisely so that monetary policy can be devoted to the task of countercyclical policy and doesn't need to take on the additional burden of looking after risk-taking," says Wilcox.

A stronger macroprudential environment may help the Fed focus more on its monetary policy role. But not all experts agree it is possible to run monetary policy that is at odds with macroprudential policy over the long term. ■

Previously published on Risk.net

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² FSB (December 2019), Vulnerabilities associated with leveraged loans and collateralised loan obligations, <https://bit.ly/2MrWRrf>

³ FSB (October 2019), Global financial stability report – Lower for longer, <https://bit.ly/2Xq47W>

⁴ BIS (March 2019), BIS quarterly review – International banking and financial market developments, <https://bit.ly/3clz511>

⁵ Sherrod Brown, Senator for Ohio (March 2020), Brown calls for FSOC briefing on plans to address risks of economic downturn due to Coronavirus, <https://bit.ly/2ZVr36i>

⁶ Board of governors of the Federal Reserve System (May 2019), Financial stability report – May 2019, <https://bit.ly/2BkNGql>

⁷ Board of governors of the Federal Reserve System (October 2014), Six federal agencies jointly approve final risk retention rule, <https://bit.ly/2zWLyVo>

⁸ LSTA (October 2013), Letter, Credit risk retention; joint further notice of proposed rule, <https://bit.ly/2XnQStS>

⁹ Federal Register (December 2014), A rule by the Comptroller of the Currency, the Federal Reserve System, the Federal Deposit Insurance Corporation, the Federal Housing Finance Agency, the Securities and Exchange Commission, and the Housing and Urban Development Department on 12/24/2014, <https://bit.ly/301dRN6>

¹⁰ FSOC (2019), 2019 Annual report, <https://bit.ly/2U211nA>

Operational crisis management

Global banks' Covid-19 responses

How LGIM, Axa, Manulife and other buy-siders tackled the toughest markets since 2008. By Ben St. Clair

Necessity is the mother of invention, says the old adage. And in recent months, asset managers and investors have been forced to reinvent their environment as well as their trading practices. In addition to the market fallout from coronavirus, their traders have faced a new and unexpected challenge: how to continue transacting away from their desks and – significantly – away from other traders.

Buy-side trading desks, which typically thrive on having traders share information and collaborate in close proximity, have been forced to change trading strategies and think differently about finding counterparties willing to trade at acceptable levels. In navigating some of the most volatile and illiquid markets since the financial crisis, sometimes the biggest challenge was simply to get a trade completed.

Need to know

- The pandemic has introduced fresh challenges to trading desks across the board, as market volatility and costs of trading surged.
- But buy-side traders say they have adapted relatively seamlessly to working remotely – with some notable changes to the way markets have functioned.
- Multiple issues forced traders to think differently about best execution and how they sourced liquidity.
- Traders say success has hinged on constant communication with portfolio managers and clients.
- Trading practice has evolved to put fewer dealers in competition for RFQs in OTC markets and a reliance on pre-trade analytics to find the best liquidity pool.
- Equity and FX traders have leaned on execution algos, and equities traded in smaller blocks throughout the day.

For this article, more than a dozen traders, market participants and industry experts spoke about how the buy side adapted to the “new normal” in currency, bond and equity markets.

“The circumstances will stick around in memory for a while, I think. Probably comparable to what the market saw after the 2008 financial crisis,” says Joost de Bakker, a trader at Netherlands and UK investment manager Cardano. “After a long period, we could return to the normal liquidity circumstances we were used to, but I think it will definitely take a [long] time.”

Equity traders, for example, began buying and selling in smaller blocks of stock and using execution algorithms to take advantage of trading opportunities quickly. In over-the-counter markets, such as rates and credit, some buy-side firms put fewer dealers in competition when asking for quotes and looked instead to their peers through alternative trading protocols.

Market participants agree that a smooth transition was contingent on constant communication with clients and portfolio managers to find the best product and trading strategy. Leaning on relationships with sell-side counterparties was also key.

Testing the bounds

Amid the upheaval, the role of buy-side traders was cast into the spotlight. These traders serve within their firms in execution and advisory roles. Their skills are put to mandatory use in Europe, where regulators have made achieving best execution through trading an obligation, compelling managers to take into account various execution factors such as price, timing and size.¹

The regulation accepts that trading conditions and particular investment products will dictate the ideal method for trading and, in some cases, that ideal can depend on the specific needs of portfolio managers and those making the investment decisions. This is where the advisory function of a trader's role comes into play, providing market colour to help managers understand liquidity conditions so that they can most effectively express investment views.

Ed Wicks, head of trading at Legal & General Investment Management, says these conversations

were especially important in less liquid fixed income and rates markets in March, where they worked “even more closely with portfolio managers”. Getting orders as quickly as possible to extend the potential window for execution made a difference, he says.

One way to gauge best execution is to compare a firm's traded levels with a market mid-price, available on screens for some OTC products and for listed instruments. In March, deciphering this mid-price became increasingly challenging in some less liquid instruments. And waiting to trade at cost levels available mere months beforehand could have meant not being able to trade at all, says Michel Lansink, head of trading at Cardano.

“Part of adapting to these changing markets is also accepting higher transaction costs. If we were to stick to whatever we were used to, then we'd probably end up trading nothing,” he says.

Conversations with clients and portfolio managers became key. “If a PM is trying to express a view in an OTC bilateral instrument, we might say you can achieve the same in this listed or cleared instrument. That advisory aspect of the job increases in those markets in times like this,” says Wicks.

In some situations, Axa Investment Managers turned to trading the underlying asset instead of its options, or index futures instead of the swaps alternatives, according to Daniel Leon, global head of trading, security financing and derivatives at the firm.

“We went into the biggest pool of liquidity and, as expected, the simplest products had the better liquidity,” he says.

Portfolio managers and clients understood the need to make quick decisions and adapted their processes to be more reactive, says Leon. “When prices can change by more than 10, 20 basis points in one move, you need to be able to react very quickly.”

For example, the desks needed to be ready to take advantage of trading opportunities as they arose, says Vincenzo Barbagallo, head of trading at Generali Insurance Asset Management.

¹ Financial Conduct Authority (January 2018), FCA Handbook, Conduct of Business Sourcebook – 11.2A Best execution – Mifid provisions, <https://bit.ly/2z1JEb8>

"It is crucial for us to understand whether our clients are flexible in terms of pricing and/or timing. That makes the difference, if you also consider that the ability to source liquidity in the market was very poor," says Barbagallo.

Others echo this sentiment, highlighting the importance of knowing how "desperate" a manager is to complete a trade and how much they're prepared to pay.

"There's always a price at which you can trade. You'd rather have those conversations than trade significantly away from a portfolio manager's expectation," says David Scilly, head of fixed income and currency dealing at First State Investments.

Still, conditions may have meant that transaction costs were too high to trade at certain points. Cardano's de Bakker said the firm refrained from trading at times, notably in less liquid products such as interest rate swaptions.

OTC: other trading constraints?

The fact that market conditions changed some of their execution decisions and traders were not "hunting around for an extra basis point" does not make it more challenging to demonstrate best execution, says Jan Mark van Mill, head of treasury and trading at Netherlands-based APG Asset Management. Since "best execution is the whole process around executing a trade", decisions must weigh a variety of aspects, including price, speed and operational risk.

In OTC markets, for example, normal market conditions would see a buy-side desk ask a handful of banks for quotes on rates or credit derivatives products. But in March, some firms found that it was better to put fewer dealers in competition – or go directly to just one. Doing so successfully relied on pre-trade liquidity analytics and understanding which counterparty was available to trade which products.

"We're not going to be going to as many counterparties in this market. Absolutely, we would be trading in a non-comp fashion. We would be calibrating the sizes that we're requesting," says Wicks.

The buy side can view axes – or indications of a counterparty's willingness to buy or sell certain products – on various platforms. Axes provide opportunities to trade with natural counterparties – those already looking to buy or sell.

In bond markets, this can mean a dealer already holds the bonds an investor wants. Instead of having to buy the credit themselves before delivering it to an investor – incurring transaction costs and possibly charging the investor more – the dealer can deliver the bonds directly, possibly at a better price.

"You need to know who is axed to trade, who's providing liquidity and which tool is more liquid," says Leon.

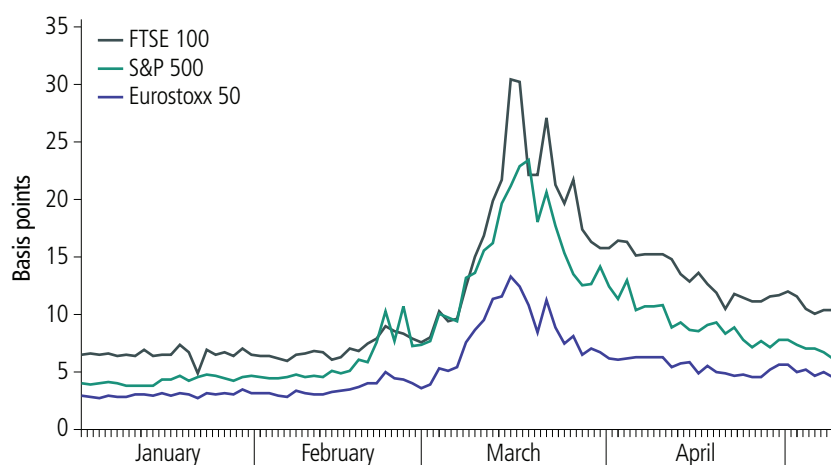
He says Axa has been making use of dealer axes for years, which it has electronically fed into its internal systems. Being able to pinpoint trade opportunities was key to its ability to trade in March's volatile markets, he notes.

Adding to the complexity was the fragmented and concentrated nature of liquidity in interest rate

products, says de Bakker at Cardano. "You really need to know which dealer can source liquidity and then work with that dealer in order to get the specific trade and size done. It requires a different execution style."

De Bakker says one way they got a sense of dealer liquidity was to speak with the bank sales traders. If they said there was poor liquidity in the market, chances are they were having trouble transacting and other dealers may be a better bet for that particular product.

1 Median stock bid/ask spread



Source: Goldman Sachs Investment Research

WFH?

Even if the raucous trading floors of the Liar's Poker generation have long been replaced by the quieter buzz of computers, today's buy- and sell-side trading desks depend on close communication – and traders working in the same room.

Now, the coronavirus pandemic has forced firms to move some traders home and others to auxiliary sites. The few left in the office are appropriately distanced.

While some firms have had a taste of what it's like for traders to work away from the office during the recent protest disruptions in Hong Kong, the global nature of the current crisis, combined with the surge in market volatility, offered a crash course in remote working. But buy-side firms say the transition has been relatively seamless.

"I've been at the firm five years, and I've never authorised anyone to trade from home on a regular basis. This is quite a new – quite a big – step for us to take and it's actually gone quite well," says Legal & General Investment Management's Ed Wicks. The firm

sent 36-inch monitors to its London traders' homes for them to connect to company-issued laptops.

Others observed similarly smooth transitions. Netherlands-based APG Asset Management started to transition to mobile working at the end of February, ensuring traders had screens, keyboards and key office equipment at home to simulate the office dealing room. Now three-quarters of traders are working from home, while the others are socially distancing in the office. Treasury and trading head Jan Mark van Mill says traders have adapted well.

Still, normal process remains disrupted and video calls and instant messaging conversations can only offer some consolation.

"We have the internal policy of executing transactions with two traders in order to reduce operational risk. We needed to be inventive in order to get that arranged, so it's definitely a lot more interaction via phone, chat and screen sharing now. We definitely needed to take some time to get fully used to that," says Cardano's Joost de Bakker.

"There was a very big difference across banks in terms of what they could offer. Some of them were completely out of business and others were the perfect partners to trade," says Cardano's Lansink.

The process accentuated the buy side's reliance on dealer balance sheets to trade in certain asset classes and products, especially in markets without two-way flow. Some buy-side traders say banks' increasingly more cautious stance only added to the trading challenges.

Without a natural interest from dealers or competitive pricing, the desk had to decide,

consistent with its client's needs, whether to postpone execution or trade away from expected prices, says Generali's Barbagallo.

Algo my way

Markets that have long been electronic, like cash equities and spot foreign exchange, offered low-touch opportunities in March.

Wicks says, at LGIM, the team adjusted some of the algorithms' settings, like timing and price limits, but the firm did not stop using equity algorithms to execute in March.

HIGH AND DRY

Even as some markets saw record volumes, traders complained of poor liquidity conditions – or the ability to trade in the desired product, size and perceived-as-fair price point.

Bank of America Securities' liquidity risk indicator, which measures funding stress in the global financial system by looking at spread-based relationships in rates, credit and currencies, shows markets experienced the highest levels of stress since the financial crisis. May levels remained elevated.

Bid/offer spreads are another way to gauge volatility and the cost of trading. According to various measures, investors in March faced some of the highest spreads in years (see chart below).

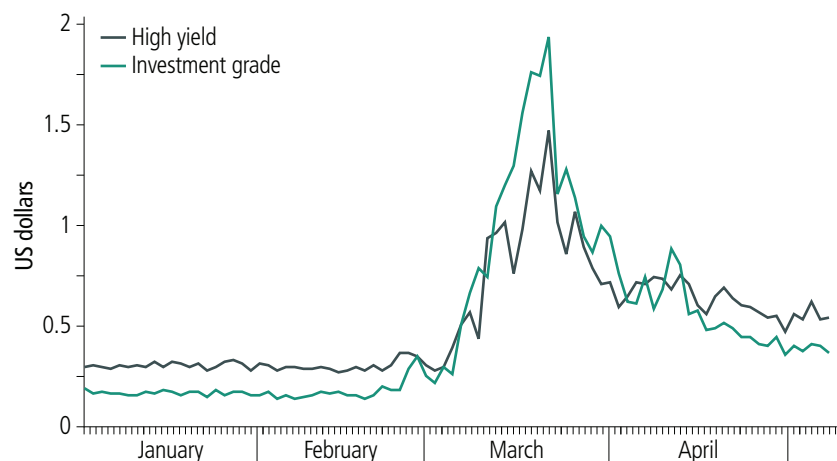
At their peak, spreads for US high-grade credit were 12 times wider during the volatility than their daily January average and exceeded those of riskier high-yield bonds, MarketAxess data shows. At the end of April, investment-grade spreads remained more than twice as high as their January average. Spreads on high-yield bonds were roughly one and a half times higher than their January average.

Equity trading experienced similarly high transaction costs. The median bid/ask spread for stocks comprising the S&P 500 jumped from an average of just over 4 basis points in January to roughly 23bp at their peak on March 23, according to daily figures from Goldman Sachs Investment Research. The median spreads on stocks in European indexes show similar jumps.

One reason for high spreads may be the inability to trade in large sizes, says Ben Springett, head of electronic and program trading at Jefferies.

"The cost of trading is still double what it was in January – even though market volumes have returned and spreads have come down and intraday volatility has come down – because we haven't seen the display size yet come back up to anywhere like what it was in January or February," he said in early April.

MarketAxess bid/ask indexes



Source: MarketAxess

"I'm not sure how effective more of a high-touch channel would be in equities. We actually had a very positive experience with our algorithms in March," he says.

On the sell side, Jefferies was especially busy on its algorithmic desk with clients looking for the speed that algorithms offer, says Ben Springett, head of electronic and program trading at the firm.

The buy side also relied on execution algorithms to trade in FX markets, to the pleasant surprise of some traders.

"Traditionally, algos have always been linked to silent and predictable markets. But they've actually become smarter and grown into a suitable partner in these choppy markets as well. They're not the exclusive domain of quiet markets anymore," says Cardano's Lansink.

Jason Fromer, head of US FICC trading at Manulife Investment Management, shares a similar view: "With the fractured nature of liquidity, we have found that algo trading has been a great way to execute trades without market impact. We have increased our algo volume dramatically," he says.

As equity volatility rose (see figure 1) some trading behaviour did change, though. Equity trading in Europe at the market close, usually the most concentrated point of liquidity during the day, saw its share of daily volume decline in March. Between March 9 and March 16, 13.2% of daily European equity volumes traded at the close, down from January's daily average of 18.8%, according to data from Jefferies. The proportion of European trading at the close rose in subsequent weeks.

Similar scenes were evident for US traders. "We've taken extra measures to advise clients on execution strategy with the abnormal widening of spreads, particularly on the market open and close, that are a result of the increased volatility," says Matt Krebs, director of outsourced trading at Dallas-based Capital Institutional Services.

Trading throughout the day gave desks more time to complete trades and find pockets of liquidity, instead of risking an order going unfilled at the closing auction. Still, stocks available to trade were often only accessible in smaller blocks than traders are used to.

Jeff LeVeen, head of outsourced trading at Jones Trading, says the "increased volatility definitely led to smaller order sizes given the lack of conviction". He called it the "the biggest adjustment" for traders to make in March.

In Europe, Jefferies data shows that the average displayed trade sizes for two weekly periods in mid-to-late March were roughly a third of what they were at the start of the year: \$62,000 down from a \$171,000 average in January. ■

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Quant modelling of economic impact

The finance industry's quants are trying their hand at modelling the virus and its economic impact. By Rob Mannix

When infection and mortality rates become the language of markets, even the brightest minds in finance are left scratching their heads.

Quants fared no better than anyone else as the coronavirus pandemic that began in Wuhan, China, late last year spread worldwide, shutting down economies and crushing markets in its wake. One investor compares the wreckage to the financial crisis and 9/11 happening at once.

As the scale of the crisis sinks in, many quants have found a new purpose: modelling the spread of the virus and its economic impact. And some are convinced they can find patterns in the data that professional epidemiologists might miss.

"Everyone that manages money is being forced to make a bet on how fast the recovery will be," says Miquel Noguer i Alonso, an adjunct professor at New York University and a former executive director at UBS.

Need to know

- Quants think they can spot patterns in the spread of the coronavirus that professional epidemiologists might miss.
- Some are repurposing network and agent-based models designed for financial analysis to forecast the spread of the disease.
- One quant model successfully predicted the peak of cases in China, South Korea and Italy weeks ahead of time. Another suggests a second wave is almost inevitable.
- Some of the concepts used in options trading could be helpful in weighing the trade-offs in policy responses to defeat the virus.
- Many quants are making their models and findings freely available to policy-makers.

"When you impose a lockdown – even for a really long time – and release it, you can still get this second breakout"

Robert Hillman, Neuron Capital

Early efforts include repurposing network and agent-based models designed for financial analysis to simulate the spread of the virus and the effectiveness of policy responses.

It's not an altruistic effort – the goal for many is to time the market recovery – but their work could help shape those policy responses as the crisis continues.

Decisions around when to impose or lift lockdowns call for calculations much like the ones quants make when pricing options.

Epidemiologists tend to think in terms of saving lives or minimising stress on the health system, while quants obsess over optionality and non-linear payoffs. The differing approaches could be complementary, says Robert Hillman, founder of Neuron Capital, a research firm.

Scientists at Imperial College London have suggested that the best way to defeat the virus is with intermittent lockdowns imposed at given thresholds of intensive care admissions. Implementing those policies has some parallels with dynamic strategy optimisation and options hedging in finance.

"There are trade-offs in terms of saving lives now versus building up bigger health risks later from economic impairment," says Hillman. "Whatever model you use, you need a way to think about those trade-offs."

In different ways, quants are grappling with the same questions as epidemiologists: When will infections peak? How long will the lockdowns last? Will there be a second wave? And there's no

doubting their enthusiasm for the task.

The language of disease transmission – "epi curves" and "R-nought rates" – has been adopted by financial engineers. Quants post on LinkedIn and Twitter about the shape of the epi curve in regions of Italy and its implications for stock markets. David Harding, the billionaire founder of quant hedge fund Winton Capital, tweets compulsively about how the latest data on the disease can and should be analysed.

Stephen Roberts, head of the Oxford-Man Institute of Quantitative Finance, says the research unit has turned itself over almost entirely to supporting efforts to model Covid-19.

MIT finance professor Andrew Lo has released a paper on the economics of vaccine development. Speaking with *Risk.net* in early March, Lo predicted not only the impending crash but also a role for quants in combating the pandemic.¹

Neuron Capital is working with researchers at the Organisation for Economic Co-operation and Development to understand the economic effects of the epidemic using agent-based and network models. Hillman is making all his coronavirus research freely available to policy-makers.

Artificial intelligence (AI) experts are even feeding questions about the epidemic to their self-learning systems. CausaLens, an AI firm that works with hedge funds, has trained its system to forecast the spread of the virus and will also make its findings public.

At NYU, finance professors have given students an assignment to model the effect of the epidemic on markets.

More, SIR

Much of what quants have done so far is rudimentary.

A common starting point has been epidemiology's canonical SIR model, which plots the spread of a disease using differential equations for the number of susceptible, infected and recovered people in the population. Others are adapting logistic growth models, which have been successfully applied to describe past epidemics.

Such methods are helpful – to a point.

"All models are wrong, but some are useful to ask the right questions and develop scenarios," says Didier Sornette, an academic and former hedge fund manager who has written about everything from earthquakes to epilepsy.

Sornette is publishing daily upper- and lower-bound estimates for coronavirus cases and deaths using generalised logistic growth models.² His analysis of data from China reveals some interesting trends – for instance, regions that were late in acting saw a quicker fall in cases after the peak, suggesting authorities clamped down harder to catch up.

But the predictive power of standard epidemiological models is limited. Small changes in assumptions about the number of infections can send forecast curves shooting up or down. Early in an epidemic, the models are effectively using the tail of a distribution to estimate the curve.

On March 10, analysts at Deutsche Bank using epidemiological models and data from South Korea predicted the US could have between 101,000 and 301,000 coronavirus cases by June 1. In reality, the US has seen a far steeper upwards curve, with over 500,000 recorded cases as of April 11.

Caleb Bastian, chief science officer at big-data company Massive Dynamics and a visiting scientist at Princeton, likens the challenge to forecasting a hurricane. "The earlier the forecasts are made, the less accurate they are," he says.

Quants argue the standard epidemiological models can be improved. One idea is to augment them with network models used to map linkages in markets and communities.

"Most of the people doing these analyses are using the SIR model but they're doing it without understanding how the model applies over networks," Bastian says.

Bastian has constructed a model that – when fed with data on an outbreak – works out the number of so-called edges, or points of contact, in the population network to explain the pattern of the spread. It can also calculate an R_0 – a measure of how contagious a disease is – as well as a recovery rate for Covid-19. This data can then be used to infer the effectiveness of any social distancing measures that are put in place.



The model has an R-squared – a measure of how closely its results correspond to real-world data – of 98 for the current epidemic, implying a high degree of accuracy.

The model predicted the peak of new cases in Italy about two weeks ahead of time. "It nailed China. It nailed South Korea. It nailed Italy," Bastian says.

The state of Ohio is using the model to guide its policy response. After he published details of the model online, Bastian was also contacted by a hedge fund and two pension funds with questions about the likely duration of the epidemic and the timing of the peak in other countries.

Another idea is to use agent-based models, which aim to simulate human behaviour with hundreds of thousands of individual computer-generated proxies, programmed with their own attributes: age, health, mobility, location, susceptibility to infection and so on.

Neuron Capital's Hillman has built such models to track crowding and systemic risk in markets for the Bank of England and hedge funds, including Brevan Howard. He is now repurposing them to simulate the spread of the virus.

Hillman initially calibrated his model to produce the same results as the one developed by epidemiologists at Imperial College, which has played a critical role in shaping the UK's policy response to the epidemic. "Then we refined and updated it with the actual data we're observing," Hillman says. "And then we ran experiments to explore the impact of different policies."

One of the more troubling findings of the agent-based model is that even long periods of quarantine cannot prevent a second wave of infections.

"That had me puzzled," Hillman says. "We spent quite a bit of time checking the code because it didn't seem right. But when you impose a lockdown – even for a really long time – and release it, you can still get this second breakout."

This is because even a small number of people at the end of their contagious period can cause the epidemic to start afresh. "You get these long chains of transmission."

Simpler epidemiological models could ignore these effects, Hillman says.

"When you think about the impact of policies, it's clear the spatial side of things – how people move around – becomes critical. That's why we're all stuck inside our houses," he says. "You need models that embrace the heterogeneity of the epidemic and its spatial network structure."

Hillman adds that the second wave of Covid-19 will be quite different to past epidemics, such as the Spanish flu. In 1918, the second wave occurred due to a mutation of the virus.

"That was natural," he says. "This time, the second wave will be totally man-made. And it's very hard to prevent."

Better data

Models are only as good as the data they are fed with, and quants are fully aware they are working with incomplete information. Months after the epidemic began, most countries are still struggling to meet the demand for testing.

In a *Risk.net* article in March, Winton's Harding wrote about the importance of making better data available to researchers.

Countries that test more will uncover more cases, creating the impression of more explosive spread in the short term. Those same countries, though, will record lower fatality rates and appear to flatten the curve sooner. And transmission may turn out to be higher than assumed if there are a high number of asymptomatic super-spreaders.

The availability of a vaccine is another important variable in longer-term projections about the epidemic's final toll.

Faced with so many unfamiliar problems, quants are turning to outside experts for data and expertise.

In early March, UBS arranged a conference call with Ian Lipkin, a top virologist and epidemiologist who was a consultant for the movie *Contagion*. Lipkin argued the consensus view on the contagiousness of Covid-19 was likely wrong.

Metabiota, a provider of epidemiological models and analytics, is fielding two enquiries a day from hedge funds and other investors – a group the firm rarely dealt with in the past. Chief executive Nita Madhav says quants have sought access to the firm's data, which covers infection rates, incubation times and policy responses for around 2,400 past epidemics.

Metabiota has also gathered data on commuter and air traffic, which can be combined with information on past epidemics to infer the spread of the coronavirus across countries.

Pito Chickering, an analyst covering medical devices and healthcare at Deutsche Bank, has been inundated with calls from fund managers. He found himself leading much of the bank's work on Covid-19 and regularly worked 16-hour days in March.

"This is not what I do for a living," says Chickering. "I'm a healthcare service analyst and a medical device analyst."

Not Katrina or Sars

Modelling the spread of the virus is only half the problem. Plotting the epidemic's effect on the real economy has proven equally tough. Here, preliminary efforts centred on drawing parallels with other epidemics and natural disasters that temporarily froze consumption, such as Sars in 2003 and Hurricane Katrina in Louisiana in 2005.

But those historical events have proven to be incomparable in scope and damage.

Unigestion Asset Management initially used existing influenza models to estimate the economic cost. These models estimate a GDP loss of roughly \$1,500 per person quarantined based on certain assumptions about a normal government response to an influenza epidemic. That proved too optimistic for Covid-19.

"All models are wrong, but some are useful to ask the right questions and develop scenarios"

Didier Sornette, academic and former hedge fund manager

In mid-March, economists at UBS estimated GDP in the US would drop 70 basis points in 2020 if Covid-19's economic impact was benchmarked to Hurricane Katrina, while conventional influenza models pointed to a 3% contraction.

By the end of the month, the bank was forecasting a 5% contraction in GDP in the second quarter after extrapolating the results of influenza models to the more severe case of the coronavirus outbreak.

The drop in GDP could be as steep as 8% if quarantines remain in place longer than expected, Unigestion said.³ That would be the largest macro shock ever seen for such a short period.

Risk modelling firm Northfield used data from military conflicts to estimate the economic cost of a worst-case scenario, in which Covid-19 causes 60 million deaths worldwide. It found compound returns for a classic 60/40 portfolio would fall around 10bp a year over 10 years if that came to pass.

More precise estimates are nigh-on impossible when epidemiological assumptions are changing so fast, Northfield's Dan diBartolomeo wrote in a note.

Two weeks after Northfield published its results, the basic assumptions about infection and mortality rates, and recovery and testing times, were all revised, diBartolomeo told *Risk.net* by email. "The best-case scenario has gotten a lot worse, but the worst-case scenario has gotten a lot better."

To further complicate matters, mortality rates and the length of quarantines do not fully explain the economic fallout. Metabiota's research shows the speed at which epidemics spread. The fear they create can have a bigger impact than the deaths they cause.

The Zika virus, which emerged in South America in 2015 and affected newborn babies in particular, took a heavier toll on the economy than other epidemics.

Analysts at Deutsche Bank have worked on estimating healthcare capacity on the premise that even a less deadly epidemic could overwhelm hospitals and spread panic, worsening the economic cost.

Grounds for optimism

The race to master epidemiological modelling is unlike anything quants have undertaken before. The task may be grisly, but the market desperately needs more reliable signals.

Duke University economist Campbell Harvey told *Risk.net* in March that markets would remain volatile until the models used to make policy decisions were made public.

Investors are also under immense pressure to claw back the record drawdowns in March. Many are fixated on identifying the 'hinge point' when they can add exposure to catch a market recovery.

"If you can anticipate the moment when the distribution of the epidemic will start to reduce, while there is still a lot of fear among the general public, that would be the time to buy," says Francesco Landolfi, a former Mediobanca executive and founder of Epiphany, a consultant on quant trading strategies.

The modelling work is already providing some comfort for investors. Quants have been among the first to see grounds for optimism and have emerged as a voice of reason amid the chaos.

At the end of March, several were pointing to early signs of a turning point in Italy and Spain.

Despite his apocalyptic forecasts about the near term, in a recent MIT webinar Lo was at pains to point out that stock markets made up lost ground relatively quickly after the Spanish flu epidemic in 1918.

"As long as you were well diversified over that period of time, even though there were short-term losses, eventually [the market] recovered," he said.

Assessing the role of quants in modelling the coronavirus outbreak, perhaps Deutsche's Chickering puts it best: "The job of quants is to bring people away from the scary person yelling 'Fire!' in the room and get them to look at the real hard numbers." ■

Previously published on Risk.net

¹ J Vu, B Kaplan, S Chaudhuri, M Mansoura, A Lo, *medRxiv* (March 2020), Financing vaccines for global health security, <https://bit.ly/2ZZ3quE>

² Ke Wu, D Darcei, Qian Wang and D Sornette (2020), Generalised logistic growth modeling of the Covid-19 outbreak in 29 provinces in China and in the rest of the world, <https://bit.ly/3gPyhPf>

³ Unigestion (March 2020), The expansion is set to end, <https://bit.ly/3dvpq6V>

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